Government
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Canada Parliament

Sessional Papers

SESSIONAL PAPERS

VOLUME 9

SECOND SESSION OF THE TWELFTH PARLIAMENT

OF THE

DOMINION OF CANADA

SESSION 1912-13

VOLUME XLVII

1091651

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Printed for distribution and sessional papers.

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Fifth Census of Canada, 1911—Manufactures for 1910 as enumerated in June, 1911.

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(This volume is bound in three parts.)

1. Report of the Auditor General for the year ended 31st March, 1912 Volume 1, Parts A to J. Volume II, Parts K to U. Volume III, Parts V to Y. Presented by Hon. Mr. White, 14th January, 1913.

Printed for distribution and sessional papers.

CONTENTS OF VOLUME 2.

2. The Public Accounts of Canada, for the fiscal year ended 31st March, 1912. Presented by Hon. Mr. White, 26th November, 1912.

Printed for distribution and sessional papers.

3. Estimates of sums required for the service of the Dominion for the year ending 31st March, 1914. Presented by Hon. Mr. White, 3rd February, 1913.

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4. Supplementary Estimates of sums required for the service of the Dominion for the year ending on the 31st March, 1913. Presented by Hon. Mr. White, 10th March, 1913.

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5. Supplementary Estimates of sums required for the service of the Dominion for the year ending on 31st March, 1914. Presented by Hon. Mr. White, 20th May, 1913.

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6. List of Shareholders in the Chartered Banks of the Dominion of Canada as on December 31, 1911. Presented by Hon. Mr. White, 26th November, 1912.

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7. Report on dividends remaining unpaid, unclaimed balances and unpaid drafts and bills of exchange in Chartered Banks of the Dominion of Canada, for five years and upwards prior to 31st December, 1911. Presented by Hon. Mr. White, 26th November, 1912.

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8. Report of the Superintendent of Insurance for year ended 1912. Presented by Hon. Mr. White.. .. ..*Printed for distribution nd sessional papers.*

9. Abstract of Statements of Insurance Companies in Canada for the year ended 1912. Presented by Hon. Mr. White.. .. .. ..*Printed for distribution and sessional papers.*

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10. Report of the Department of Trade and Commerce for the fiscal year ended 31st March, 1912. (Part I.—Canadian Trade). Presented by Hon. Mr. Foster, 30th January, 1913.
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10*a*. Report of the Department of Trade and Commerce, for the year ended 31st March, 1912. (Part II.—Canadian Trade with (1) France, (2) Germany, (3) United Kingdom, and (4) United States). Presented by Hon. Mr. Foster, 12th December, 1912.
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10*b*. Report of the Department of Trade and Commerce for the fiscal year ended 31st March, 1912. (Part III.—Canadian Trade with Foreign Countries, except France, Germany, the United Kingdom and United States). Presented by Hon. Mr. Foster, 15th January, 1913.. .. ..*Printed for distribution and sessional papers.*

10*c*. Report of the Department of Trade and Commerce, for the fiscal year ended 31st March, 1912. (Part IV.—Miscellaneous Information). Presented by Hon. Mr. Reid, 17th February, 1913.. ... .*Printed for distribution and sessional papers.*

10*d*. Report of the Board of Grain Commisioners for Canada. Presented by Hon. Mr. Foster, 3rd February, 1913.. .. ..*Printed for distribution and sessional papers.*

10*e*. Report of the Department of Trade and Commerce for the fiscal year ended 31st March 1912. (Part VI.—Subsidized Steamship Services). Presented, 1913.
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10*f*. Report of Trade and Commerce for fiscal year ended 31st March, 1912. (Part VII.—Trade of Foreign Countries, Treaties and Conventions). Presented, 1913.
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13. Report of the Department of Inland Revenue for year ended 31st March, 1912. (Part II.—Inspection of Weights and Measures, Gas and Electricity). Presented by Hon. Mr. Nantel, 25th November, 1912.. .. ..*Printed for distribution and sessional papers.*

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16. Report of the Director and Officers of the Experimental Farms for the year ending 31st March, 1912. Presented by Hon. Mr. Burrell, 14th January, 1913.
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17. Criminal Statistics for the year ended 30th September, 1911, (Appendix of the Report of the Minister of Agriculture, for the year 1911). Presented by Hon. Mr. Borden, 2nd June, 1913... .. ..*Printed for distribution and sessional papers.*

18. Return of the Twelfth General Election for the House of Commons of Canada, held on the 14th and 21st of September, 1911. Presented by Hon. The Speaker, 27th November, 1912.. .. ..*Printed for distribution and sessional papers.*

18*a*. Return of By-Elections (Twelfth Parliament) for the House of Commons of Canada, held during the year 1912. Presented by Hon. The Speaker, 10th March, 1913.
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19. Report of the Minister of Public Works on the works under his control for the fiscal period ended 31st March, 1912. Part I. Presented by Hon. Mr. Rogers, 4th December, 1912. Part II. Ottawa River Storage and Geodetic Levelling.
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20*a*. Canal Statistics for the season of Navigation, 1912. Presented by Hon. Mr. Cochrane, 15th April, 1913.. .. ..*Printed for distribution and sessional papers.*

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20*e*. Express Statistics of the Dominion of Canada, for the year ended 30th June, 1912. Presented by Hon. Mr. Cochrane, 12th February, 1913.
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21*c*. Supplement to Forty-fifth Report of the Department of Marine and Fisheries, for fiscal year 1911-12,—Marine Branch—Influence of Icebergs and Land on the temperature of the Sea. Presented by Hon. Mr. Hazen, 17th February, 1913.
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22. Forty-fifth Annual Report of the Department of Marine and Fisheries, 1912,—Fisheries. Presented by Hon. Mr. Hazen, 5th December, 1912.
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28. Report of the Royal Northwest Mounted Police, 1912. Presented by Hon. Mr. Borden, 14th January, 1913... .. ..*Printed for distribution and sessional papers.*

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30. The Civil Service List of Canada, 1912. Presented by Hon. Mr. Coderre, 3rd December, 1912.. .. ..*Printed for distribution and sessional papers.*

31. Fourth Annual Report of the Civil Service Commission of Canada for the period from 1st September, 1911, to 31st August, 1912. Presented by Hon. Mr. Coderre, 24th January, 1913.. .. ..*Printed for distribution and sessional papers.*

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34. Report of the Minister of Justice as to Penitentiaries of Canada, for the fiscal year ended 31st March, 1912. Presented by Hon. Mr. Doherty, 27th November, 1912.
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35. Report of the Militia Council for the fiscal year ending 31st March, 1913. Presented by Hon. Mr. Hughes, 14th January, 1913. ..*Printed for distribution and sessional papers.*

36. Report of the Department of Labour for the fiscal year ending 31st March, 1912. Presented by Hon. Mr. Crothers, 28th November, 1912.
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36a. Fifth Report of the Registrar of Boards of Conciliation and Investigation of the proceedings under "The Industrial Disputes Investigation Act, 1907," for the fiscal year ending 31st March, 1912. Presented by Hon. Mr. Crothers, 28th November, 1912.
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38. Report of the Department of the Naval Service, for the fiscal year ending 31st March, 1912. Presented by Hon. Mr. Hazen, 28th November, 1912.
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39. "Miscellaneous Unforeseen Expenses," from the 1st April, to the 21st November, 1912, in accordance with the Appropriation Act of 1912. Presented by Hon. Mr. White, 25th November, 1912... .. ..*Not printed*

40. Statement of Treasury Board over-rulings, under Section 44, Consolidated Revenue and Audit Act. Presented by Hon. Mr. White, 26th November, 1912... .. ..*Not printed.*

41. Statement in pursuance of Section 17 of the Civil Service Insurance Act, for the year ending 31st March, 1912. Presented by Hon. Mr. White, 26th November, 1912.
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42. Statement of Receipts and Expenditures of the Ottawa Improvement Commission to 31st March, 1912. Presented by Hon. Mr. White, 26th November, 1912.....*Not printed*

43. Statement of Governor General's Warrants issued since the last Session of Parliament on account of 1912-13. Presented by Hon. Mr. White, 26th November, 1912.
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44. Statement of Superannuation and Retiring Allowances in the Civil Service during the year ending 31st December, 1912, showing name, rank, salary, service, allowance and cause of retirement of each person superannuated or retired, also whether vacancy is filled by promotion or by appointment, and salary of any new appointee. Presented by Hon. Mr. White, 26th November, 1912.. .. ..*Not printed*

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45*a*. Return to lands sold by the Canadian Pacific Railway Company during the year which ended on the 1st October, 1912. Presented by Hon. Mr. Roche, 14th January, 1913.. .. ..*Not printed.*

45*b*. Return to an Address to His Royal Highness the Governor General of the 27th January, 1913, for a copy of all applications made by the Canadian Pacific Railway Company for authorization to make new issue of stock, addressed to the Governor in Council, and of all correspondence with regard to the same. Presented 16th April, 1913, by Sir Wilfrid Laurier.. .. ..*Not printed*

46. Return to an Order of the House of the 18th March, 1912, for a copy of all reports made by the Inspector of Agents for placing Immigrants, both domestic servants and farm labourers, in Ontario and Quebec, during the years 1910 and 1911. Presented 27th November, 1912, by Mr. Sutherland.. .. ..*Not printed.*

47. Return to an Order of the House of the 11th March, 1912, for a copy of all letters, telegrams and other papers in connection with complaints of whatever nature against Commission Agents for placing farm labourers in Ontario, also officials connected with any agency in Ontario, during the year 1910 and 1911. Presented 27th November, 1912 by Mr. Sutherland.. .. ..*Not printed*

48. Copy of Order in Council No. P. C. 1275, dated 13th May, 1912, "Award of compensation to men belonging to the Royal Canadian Navy, who may be permanently disabled though injuries or illness contracted during drill, training or on duty." Presented by Hon. Mr. Hazen, 27th November, 1912.. .. ..*Not printed.*

48*a*. Copies of plans included in the tender of Messrs. Cammel, Laird & Company, dated 29th April, 1911, for the construction of ships for the Canadian Naval Service. Presented by Hon. Mr. Hazen, 18th December, 1912.. .. ..*Not printed.*

48*b*. An Act respecting the Naval Service of Canada." (Copy of Order in Council, No. P. C. 126 dated 20th January, 1913, "Amendment to the Regulations for the Entry of Naval Cadets)." Presented by Hon. Mr. Hazen, 4th February, 1913.. ..*Not printed.*

49. Regulations under "The Destructive Insect and Pest Act." Presented by Hon. Mr. Burrell, 28th November, 1912.. .. ..*Not printed.*

50. Statement of the affairs of the Royal Society of Canada, for the year ended 30th April, 1912. Presented by Hon. Mr. White, 29th November, 1912.. .. ..*Not printed.*

51. Ordinances of the Yukon Territory passed by the Yukon Council in the year 1912. Presented by Hon. Mr. Coderre, 3rd December, 1913.. .. ..*Not printed*

52. Return of Orders in Council which have been published in the *Canada Gazette*, between 1st August, 1911, and 30th September, 1912, in accordance with the provisions of Section 77 of the Dominion Lands Act, Chapter 20 of the Statutes of Canada, 1908. Presented by Hon. Mr. Roche, 5th December, 1912.. .. ..*Not printed.*

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52*a*. Return of Orders in Council passed between the 1st August, 1911, and 30th September, 1912, in accordance with the provisions of Section 5 of the Dominion Land Survey Act, Chapter 21, 7-8 Edward VII. Presented 5th December, 1912, by Hon. Mr. Roche
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52*b*. Return of Orders in Council which have been passed and published in the *Canada Gazette* and in the British Columbia *Gazette*, between 1st August, 1911, and 30th September, 1912, in accordance with provisions of Subsection (*d*) of Section 38 of the regulations for the survey, administration, disposal and management of Dominion Lands within the 40-mile Railway Belt in the Province of British Columbia. Presented by Hon. Mr. Roche, 5th December, 1912.. .. ..*Not printed*

52*c*. Return to an Order of the House of the 24th February, 1913, for a copy of all regulations issued by the Minister of the Interior, relating to the disposition of Dominion lands between 8th April, 1905, and 12th October, 1911. Presented by Hon. Mr. Roche, 25th March, 1913.. .. ..*Not printed.*

53. A detailed statement of all bonds or securities registered in the Department of the Secretary of State of Canada, since last return (28th November, 1911) submitted to the Parliament of Canada under Section 32 of Chapter 19, of the Revised Statutes of Canada, 1906. Presented by Hon. Mr. Coderre, 4th December, 1912.. .. ..*Not printed.*

54. Annual Return respecting Trade Unions under Chapter 125, R.S.C., 1906. Presented by Hon. Mr. Coderre, 4th December, 1912... .. ..*Not printed.*

55. Deliberation of the Canada-West Indies Conference, and Agreement between Canada and certain of the West India Colonies. Presented by Hon. Mr. Foster, 4th December, 1912.. .. ..*Printed for distribution and sessional papers*

56. Orders in Council passed between the 1st August, 1911, and 30th September, 1912, in accordance with the provisions of the Rocky Mountains Park Act, Chapter 60, Revised Statutes of Canada, 1906. Presented by Hon. Mr. Rogers, 4th December, 1912.
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56*a*. Return of Orders in Council passed between the 1st August, 1911, and 30th September, 1912, in accordance with the provisions of the Forest Reserves and Park Act, Section 19, of Chapter 10, 1-2 George V. Presented by Hon. Mr. Roche, 5th December, 1912.
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57*a*. Report on the organization of the Public Service of Canada, by Sir George Murray. Presented by Hon. Mr. Borden, 18th December, 1912.
Printed for distribution and sessional papers.

58. Report of the proceedings for the preceding year of the Commissioners of Internal Economy of the House of Commons, pursuant to Rule 9. Presented by Hon. The Speaker, 9th December, 1912.. .. ..*Not printed.*

59. Schedules of Trade Transactions between the West Indies and Canada, the United States and the United Kingdom, compiled from the West Indian blue books and statistics. Presented by Hon. Mr. Foster, 12th December, 1912.
Printed for distribution and sessional papers.

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59*a*. Trade Statistics of Imports and Exports in possession of the Government, *re* British West Indies. (*Senate*).. .. ..*Not printed.*

60. Return showing correspondence concerning the calling for tenders for the Ships of War of Canada, together with copies of tenders. Presented by Hon. Mr. Hazen, 12th December, 1912.. .. ..*Not printed.*

61. Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence, telegrams, reports and documents relating to the dismissal of John R McDonald, Heatherton, Antigonish County, as Indian agent for the district including the Counties of Antigonish and Guysborough, and the appointment of his successor. Presented 4th January, 1913.—*Mr. Chisholm* (*Antigonish*).. .. ..*Not printed.*

61*a*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Dr. C. P. Bissett, Physician to the Indians at Salmon River, Richmond County, N.S. Presented 14th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*b*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Michael Murphy, postmaster at Point Micheau, Richmond County, N.S. Presented 4th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*c*. Return to an Order of the House of the 9th December, 1912, for copy of all charges correspondence, letters, telegrams and other documents relating to the dismissal of David A. McLeod, Postmaster at Cleveland, Richmond County, N.S. Presented 14th January.—*Mr. Kyte*.. .. ..*Not printed.*

61*d*. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, letters, complaints, telegrams, reports, and other documents in the possession of the Post Office Department relating to the dismissal of John Milward, Postmaster at Stormont, Guysborough County, N.S. Presented 14th January, 1913.—*Mr. Sinclair.*
Not printed.

61*e*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents, relating to the dismissal of Kenneth F. McAskill, Postmaster at Loch Lomond, Richmond County, N.S. Presented 14th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*f*. Return to an Address to His Royal Highness the Governor General of the 25th March, 1912, for a copy of all letters, telegrams, memorandums and Orders in Council, relating to the dismissal of Mr. W. W. Hayden, late wharfinger of the government wharf at Digby, Nova Scotia. Presented 14th January, 1913.—*Mr. MacLean* (*Halifax*).
Not printed.

61*g*. Return to an Order of the House of the 11th December, 1912, for a copy of all complaints and charges made against W. B. Langley, assistant at Lobster Hatchery, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal and the appointment of a successor. Presented 14th January, 1913.—*Mr Sinclair*.. .. ..*Not printed.*

61*h*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Fred. E. Cox, engineer lobster hatchery at Isaac's Harbour, Guysborough County, N.S., and of the evidence taken and report of investigation held by H. P. Duchemin in regard to the same. Presented 14th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61*i*. Return to an Order of the House of the 11th December, 1912, for a copy of all complaints and charges made against Simon Hodgson, engineer lobster hatchery at Isaac's Harbour, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal and the appointment of a successor. Presented 14th January 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*j*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Henry Henlow, chief engineer at lobster hatchery at Canso, Guysborough County, N.S. Presented 14th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*k*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of H. C. V. LeVatte, harbour master at Louisburg, Cape Breton South, N.S., and of evidence taken and report of investigations held by H. P. Duchemin, in regard to the same. Presented 14th January, 1913.—*Mr. Carroll*.. .. ..*Not printed.*

61*l*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John Cummings, assistant at the lobster hatchery at Isaac's Harbour, Nova Scotia, and of evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same. Presented 14th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*m*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of W. G. Matthews, coxswain, lifeboat crew at Canso, Guysborough County, N.S., and all evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 14th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*n*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relating to the dismissal of Joseph Shean, harbour master at North Sydney, N.S., in the riding of North Cape Breton and Victoria. Presented 14th January, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61*o*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents, relating to the dismissal of George H. Sampson, keeper of the storm signal at Lower L'Ardoise, Richmond County, N.S. Presented 14th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*p*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Alexis Vigneau, captain of the patrol boat at Arichat, Richmond County, N.S. Presented 14th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*q*. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all correspondence, Orders in Council and all other papers or documents in any way relating to the dismissal of Emeri Thivierge, from the position of fisheries inspector for the Counties of Prescott and Russell. Presented 14th January, 1913.—*Mr. Murphy*.. .. ..*Not printed.*

61*r*. Return to an Order of the House of the 9th December, 1912, for a return showing all the public officers of the Inland Revenue Department in the County of St. Jean Iberville, removed by the present Government since 1st May, 1912, together with the names and duties of such persons, the reasons of their dismissal, the nature of the

CONTENTS OF VOLUME 27—*Continued.*

complaints against them, the names of the persons who brought these complaints; also a copy of all correspondence relating thereto, and of the reports of inquiries in the cases where such have been held. Presented 14th January, 1913.—*Mr. Demers.*

Not printed.

61*s*. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, complaints, petitions, memoranda, notes of evidence, reports of investigations and other documents in the possession of the Department of Inland Revenue regarding the dismissal of J. Fabien Bugeaud, Bonaventure, Quebec, assistant inspector of weights and measures in the Quebec district, and the appointment of his successor or successors, with the names, residence, salaries and duties; also of all documents relating to A. B. Caldwell, New Carlisle, Quebec, joint assistant inspector with J. Fabien Bugeaud, and the duties assigned to him, together with a copy of all recommendations for said new appointment. Presented 14th January, 1913.—*Mr. Marcil* (*Bonaventure*).. .. ..*Not printed.*

61*t*. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all correspondence, Orders in Council and all other papers or documents in any way relating to the dismissal of Duncan McArthur, from the Annuities Branch, while the said branch was attached to the Department of Trade and Commerce. Presented 15th January, 1913.—*Mr. Murphy*.. .. ..*Not printed.*

61*u*. Return to an Order of the House of the 26th February, 1912, for a copy of all documents, letters, requests, reports, recommendations and evidence taken under investigation by Dr. Shentliff, relating to the dismissal of Charles O. Jones, postmaster of Bedford, County of Missisquoi. Presented 15th January, 1913.—*Mr. Kay.*

Not printed.

61*v*. Return to an Order of the House of the 1st April, 1912, for a copy of all letters, telegrams, complaints or other papers or documents in the possession of the Government or any department thereof, relating to the dismissal of Archibald Barss, postmaster, New Harbour, West, Guysborough County, N.S. Presented 15th January. 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*w*. Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, documents, recommendation and other reports respecting the dismissal of Dr. A. Allaire as surgeon of the penitentiary of St. Vincent de Paul, and also respecting the payments of his gratuities, superannuation or retiring allowance. Presented 15th January, 1913.—*Mr. Wilson* (*Laval*).. .. ..*Not printed*

61*x*. Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, documents, recommendations and reports respecting the dismissal of Oscar Beauchamp as warden of the penitentiary of St. Vincent de Paul, and also respecting the payments of his gratuities, superannuation or retiring allowance. Presented 15th January, 1913.—*Mr. Wilson* (*Laval*).. .. ..*Not printed.*

61*y*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of John McDonald, freight handler and checker Intercolonial railway at Sydney Mines, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 16th January, 1913.—*Mr. Mackenzie*.. .. ..*Not printed.*

61*z*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, correspondence, documents and reports relating to the dismissal of Allan Kinney, of Linwood, Antigonish County, Nova Scotia, a sectionman on the Intercolonial rail-

CONTENTS OF VOLUME 27—*Continued.*

way, and for a statement in detail of the expenses in connection with the investigation of the charges against him. Presented 16th January, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed*

61*aa*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, correspondence, documents and reports relating to the dismissal of Charles Landry, of Pomket, Antigonish county, Nova Scotia, a sectionman on the Intercolonial railway, and for a statement in detail of the expenses connected with the investigation of the charges against him. Presented 16th January, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed.*

61*bb*. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, documents, reports, correspondence, &c., relating to the dismissal of Patrick Decoste, an employee on the ferry steamer *Scotia* between Mulgrave and Point Tupper on the Intercolonial railway. Presented 16th January, 1913.. .. ..*Not printed*

61*cc*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Harry E. McDonald, assistant engineer at St. Peters Canal, Richmond County, N.S Presented 13th January, 1913.—*Mr. Kyte.*

61*dd*. Return to an order of the House of the 9th December, 1912, for a copy of all letters, papers, documents, telegrams, and charges relating to a complaint against Neil Ross sectionman on the Intercolonial railway at West River, County of Pictou, and of the evidence taken at the investigation, of the report of the commissioner thereon, and of all letters, papers or other documents relating to the appointment of his successor. Presented 16th January, 1913.—*Mr. Macdonald*.. .. ..*Not printed.*

61*ee*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters correspondence, documents and reports relating to the dismissal of James Armstrong, of Heatherton, Antigonish County, N.S., a sectionman on the Intercolonial railway, and for a statement in detail of the expenses connected with the investigation of the charges against him. Presented 16th January, 1913.—*Mr. Chisholm (Antigonish)*. *Not printed.*

61*ff*. Return to an Order of the House of the 4th December, 1912, for a copy of all letters, telegrams and other documents, relating to the dismissal of Thomas J. Gray, as car inspector on the Intercolonial railway at Westville, County of Pictou. Presented 16th January, 1913.—*Mr. Macdonald*.. .. ..*Not printed.*

61*gg*. Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence, telegrams and reports relating to the dismissal of Colin Macdonald, of James River Station, County of Antigonish, as Intercolonial sectionman, and the appointment of his successor. Presented 16th January, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed.*

61*hh*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of A. T. Gannon, car repairer and inspector Intercolonial railway at North Sydney, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 16th January, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61*ii*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, correspondence, documents, and reports relating to the dismissal of Huber Myatte, Tracadie, Antigonish County, Nova Scotia, a sectionman on the Intercolonial railway and for a statement in detail of the expenses connected with the investigation of the charges against him. Presented 16th January, 1913.—*Mr. Chisholm* (*Antigonish*).
Not printed.

61*jj*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, correspondence, documents, and reports relating to the dismissal of John McDonnell, Afton Station, Antigonish County, Nova Scotia, a sectionman on the Intercolonial railway, and for a statement in detail of the expenses connected with the investigation of the charges against him. Presented 17th January, 1913.—*Mr. Chisholm* (*Antigonish*).. .. ..*Not printed.*

61*kk*. Return to an Order of the House of the 9th December, 1911, for a copy of all letters, correspondence, documents and reports relating to the dismissal of William Landry, of Pomket, Antigonish County, Nova Scotia, a section foreman of the Intercolonial railway, and for a statement in detail of the expenses connected with the investigation of the charges againt him. Presented 17th January, 1913.—*Mr. Chisholm* (*Antigonish*).. .. ..*Not printed*

61*ll*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, telegrams and other documents relative to the dismissal of D. J. McDougall, section foreman, Intercolonial railway, Grand Narrows, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 17th January, 1913.—*Mr. McKenzie.*
Not printed.

61*mm*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Dan. A. Coffey, lockman at St. Peter's canal, Richmond County, N.S., and of the evidence taken and of the reports of investigation held by H. P. Duchemin, in regard to the same, and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Also, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of W. A. McNeil, lockman at St. Peter's canal, Richmond County, N.S., and of the evidence taken and of the report of investigation held by H. P. Duchemin in regard to the same, and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 17th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*nn*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John P. Meagher, foreman deckhand on steamship *Scotia*, Mulgrave, Guysborough County, N.S., and of all evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 17th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*oo*. Return to an Order of the House of the 4th December, 1912, for a copy of all letters, telegrams, evidence taken, reports, &c., and of all correspondence between the Postmaster General and officers of his department, and James Gibson, ex-postmaster of Alameda, Sask., in connection with the instructions sent him to hand the office over to E. Cronk. Presented 17th January, 1913.—*Mr. Turriff*.. .. ..*Not printed.*

61*pp*. Return to an Order of the House of the 11th December, 1912, for a copy of all papers, documents and correspondence relating to the dismissal of Captain C. E. Miller from the 75th Regiment. Presented 17th January, 1913.—*Mr. Maclean* (*Halifax*).
Not printed.

CONTENTS OF VOLUME 27—*Continued.*

61*qq*. Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence, letters and telegrams relating to the dismissal of J. N. N. Poirier, collector of excise at Victoriaville, Quebec, and also of the inquiry made by N. Garceau, by the Minister of Inland Revenue, and especially of two affidavits given by Ludger Frechette and Joseph Faucher. Presented 17th January, 1913.—*Mr. Brouillard.* *Not printed.*

61*rr*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of Abraham Astephen, of North Sydney, N.S., interpreter Immigration Department at North Sydney, N.S., in the riding of North Cape Breton and Victoria. Presented 17th January, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61*ss*. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all correspondence, Orders in Council, and all other papers or documents in any way relating to the dismissal of Robert Dow from the Immigration Branch of the Department of the Interior at Ottawa. Presented 17th January, 1913. —*Mr. Murphy*.. .. ..*Not printed.*

61*tt*. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, correspondence, &c., relating to the dismissal of John Ware of the Immigration Branch of the Interior Department at Halifax, N.S. Presented 17th January, 1913.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

61*uu*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges correspondence, letters, telegrams, and other documents relative to the dismissal of Richard Hickey, agent Immigration Department at North Sydney, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same, and a detailed statement of the expenses of such investigation. Presented 17th January, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61*vv*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges correspondence, letters, telegrams, and other documents relative to the dismissal of Dr. J. W. McLean, of North Sydney, N.S., medical examiner, Immigration Department at North Sydney, N.S., in the riding of North Cape Breton and Victoria. Presented 17th January, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61*ww*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John A. McRea, lightkeeper, at Margaree Island, Inverness County, Nova Scotia, of the evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 17th January, 1913.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed.*

61*xx*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Thomas Brymer, lightkeeper at Lower L'Ardoise, Richmond County, N.S. Presented 17th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*yy*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges correspondence, letters, telegrams and other documents relating to the dismissal of Dominique Boudrot, buoy contractor, at Petit de Grat, Richmond County, N.S. Presented 17th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61*zz*. Return to an Order of the House of the 4th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents concerning the dismissal of Frederick F. Doucet, keeper of the lighthouse at the entrance of the harbour of Caraquet, County of Gloucester, and the nomination of his successor. Presented 17th January, 1913.—*Mr. Turgeon*.. .. ..*Not printed.*

61*aaa*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of W. H. Henlow, keeper of storm drum, Liscomb, Guysborough County, N.S. Presented 17th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*bbb*. Return to an Order of the House of the 4th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of David Falconer, lightkeeper at Cariboo Island, County of Pictou. Presented 17th January, 1913.—*Mr. Macdonald*.. .. ..*Not printed.*

61*bbb*. Return to an Order of the House of the 4th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of M. Wilson Lawlor, harbour commissioner at North Sydney, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 17th January, 1913.—*Mr. McKenzie.*

Not printed.

61*ddd*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of P. J. McDonald, harbour commissioner at North Sydney, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 17th January, 1913.—*Mr. McKenzie.*

Not printed.

61*eee*. Return to an Order of the House of the 9th December, 1912, for a return showing: 1. The names of all lightkeepers in the Province of Nova Scotia who were dismissed from office or employment since 10th October, 1911, together with the date of each dismissal. Presented 17th January, 1913.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

61*fff*. Return to an Order of the House of the 4th December, 1912, for a return showing the detail and number of dismissals from public offices in the Department of Marine and Fisheries to this date in the County of Bonaventure, the names of the dismissed occupants, the reasons for their dismissal, the complaints against such officials and a copy of all correspondence with respect to the same, and of all reports of investigations where such were held; as well as a list of the new appointments made by the department, with names, residences, salaries and duties,and a copy of all recommendations of such appointments. Presented 17th January, 1913.—*Mr. Marcil (Bonaventure).*

Not printed.

61*ggg*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of H. L. Tory, fishery officer at Guysborough, Guysborough County, N.S., and of all evidence taken, and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of the investigation. Presented 17th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*hhh*. Return to an Order of the House of the 4th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents in the possession of the Department of Marine and Fisheries relating to the dismissal of John W. Davis, fishery officer, Guysborough, N.S. Presented 17th January, 1913.—*Mr. Sinclair.*

Not printed.

CONTENTS OF VOLUME 27—*Continued.*

61*jjj*. Return to an Order of the House of the 4th December, 1912, for a copy of all charges correspondence, letters, telegrams and other documents relating to the dismissal of Martin Bourque, lightkeeper at River Bourgeois, Richmond County, N.S., and of the evidence taken and of the report of the investigation held by H. P. Duchemin in regard to the same, and a detailed statement of the expenses of such investigation, and a copy of all papers relating to the appointment of his successor. Presented 17th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*jjj*. Return to an Order of the House of the 4th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Frederick Poirier, buoy contractor, at Descouse, Richmond County, N.S. Presented 17th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*kkk*. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, letters, telegrams and petitions for and against the dismissal of Dr. George Pinault, as medical health officer of the Mic-Mac Indian reserve, at Ste. Anne de Restigouche, Bonaventure County, Quebec, and of all documents relating to the appointment of a successor, with the name, residence, salary and duties of the new appointee. Presented 20th January, 1913.—*Mr. Marcil*.. .. ..*Not printed.*

61*lll*. Return to an Order of the House of the 1st April, 1912, for a copy of all papers, letters, &c., concerning the dismissal of Frederick Veit, employed by the Department of Marine and Fisheries in the County of Gaspé. Presented 20th January, 1913.—*Mr. Lemieux*.. .. ..*Not printed.*

61*mmm*. Return to an Order of the House of the 1st April, 1912, for a copy of all letters, petitions, complaints, declarations and other documents in the possession of the Department of Marine and Fisheries, relating to the dismissal of Mr. Alfred Lalonde, employed in the warehouse of the Government yards at St. Joseph de Sorel and the appointment of his successor. Presented 20th January, 1913.—*Mr. Cardin*..*Not printed.*

61*nnn*. Return to an Order of the House of the 1st April, 1912, for a copy of all letters telegrams, complaints or other papers or documents in the possession of the Government or any department thereof, relating to the dismissal of James Webber, lightkeeper, Tor Bay Point, N.S. Presented 20th January, 1913.—*Mr. Sinclair.*
Not printed.

61*ooo*. Return to an Order of the House of the 1st April, 1912, for a copy of all documents letters, inquiries, reports, evidence, &c., relating to the dismissal or the resignation of Baptiste Desjardins as lighthouse keeper at Kamouraska. Presented 20th January, 1913.—*Mr. Lapointe (Kamouraska)*.. .. ..*Not printed.*

61*ppp*. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, letters, telegrams and other documents relating to the dismissal of Angus Smith, pilot on the steamer *Earl Grey*, and also of all the evidence taken at the latest investigation held in regard to the said complaints, and of the report of the investigation with regard to the same. Presented 20th January, 1913—*Mr. Macdonald.*
Not printed.

61*qqq*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Michael J. Sampson, lightkeeper at Lower L'Ardoise, Richmond County, N.S. Presented 20th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*rrr*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of William Hackett, harbour commissioner at North Sydney, Nova Scotia, in the riding

CONTENTS OF VOLUME 27—*Continued.*

of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin in regard to same, and a detailed statement of the expenses of such investigation. Presented 20th January, 1913.—*Mr. McKenzie.*

Not printed.

61*sss*. Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence and other documents in the possession of the Department of Marine and Fisheries relating to the dismissal of Hormidas Lacasse, as wharfinger on the government wharf at Wendover, County of Prescott, Ontario, and the appointment of his successor. Presented 20th January, 1913.—*Mr. Proulx*.. .. ..*Not printed.*

61*ttt*. Return to an Order of the House of the 9th December, 1912, for a copy of all documents, papers, evidence and correspondence, relating to the dismissal of Geoffrey Gorman, coxswain of the lifeboat station at Herring Cove, Halifax County, N.S. Presented 20th January, 1913.—*Mr. Maclean (Halifax)*.. .. .. *Not printed.*

61*uuu*. Return to an Order of the House of the 10th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Captain George Wetmore, harbour master at Yarmouth, Yarmouth County, N.S., and the same information regarding the appointment of Captain Wetmore's successor, and of all evidence taken and report of investigation held by Charles Lane in regard to the same, also a detailed statement of expenses of such investigation. Presented 20th January, 1913.—*Mr. Law*.. .. ..*Not printed.*

61*vvv*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Stanley Henlow, lightkeeper at Liscomb, Guysborough County, N.S., and of evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 20th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*www*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of H. C. V. LeVatte, fishery officer at Louisburg, Cape Breton South, N.S., and of the evidence taken and reports of investigations held by H. P. Duchemin, in regard to the same. Presented 20th January, 1913.—*Mr. Carroll*.. .. ..*Not printed.*

61*xxx*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Elias M. Boudrot, keeper of storm signal at Petit de Grat, Richmond County N.S., and of the evidence taken and report of investigation held by H. P. Duchemin in regard to the same and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 20th January, 1913.—*Mr Kyte*.. .. ..*Not printed.*

61*yyy*. Return to an Order of the House of the 10th December, 1912, for a return of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of A. B. Cox, Superintendent of Reduction Works at Canso, Guysborough County, N.S., and of all evidence taken and report of investigation held by H. P Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 20th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*zzz*. Return to an Order of the House of the 9th December, 1912, for a copy of all complaints and charges made against Jeffrey Crespo, sub-collector of Customs at Harbour au Bouche, Antigonish County, Nova Scotia, and of all letters, telegrams, correspondence and reports relating in any way to his dismissal and the appointment of a successor. Presented 20th January, 1913.—*Mr. Chisholm (Antigonish)*.

Not printed.

CONTENTS OF VOLUME 27—*Continued.*

61*aaaa*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, papers, charges and correspondence between the Department of Customs and all other persons regarding the dismissal from office of Thomas Cameron, preventive officer at Andover, N.B., and also of all evidence and reports thereon with reference to the dismissal of the said officer. Presented 20th January, 1913.—*Mr. Michaud.*
Not printed.

61*bbbb*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of L. W. Pye, customs officer at Liscomb, Guysborough County, N.S., and of all evidence taken and reports of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 20th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*cccc*. Return to an Order of the House of the 9th December, 1912, for a copy of all complaints, accusations, inquiries, reports, correspondence, and of all documents relating to the dismissal of Lucien O. Thisdale, a customs employee at Valleyfield, Quebec, and the appointment of his successor. Presented 20th January, 1913.—*Mr. Papineau.*
Not printed.

61*dddd*. Return to an Order of the House of the 11th December, 1912, for a copy of all letters, telegrams, correspondence, reports, and other documents relating to the dismissal of Alexander Macdonald of Doctor's Brook, Antigonish County, as sub-collector of customs. Presented 20th January, 1913.—*Mr. Chisholm (Antigonish).*
Not printed.

61*eeee*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of Henry Cann, customs official and preventive officer at North Sydney, Nova Scotia, in the riding of North Cape Breton and Victoria. Presented 20th January, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61*ffff*. Return to an Order of the House of the 10th December, 1912, for a copy of all documents concerning the dismissal of Charles Mennier, customs preventive officer at Marieville, Quebec. Presented 20th January, 1913.—*Mr. Lemieux*.. .. ..*Not printed.*

61*gggg*. Return to an Order of the House of the 5th December, 1912, for a copy of all charges, correspondence, letters, telegrams, instructions, minutes of evidence taken and had on any inquiry investigation had, held or taken, and of all other papers and documents relating to the dismissal of George H. Cochrane, Collector of Customs at the Port of Moncton, New Brunswick; together with a copy of all letters and other correspondence between the Honourable Minister of Customs, and the member representing the County of Westmorland, New Brunswick, in this House, and of all letters, papers, telegrams, recommendations, appointments, or other papers and documents relating to the appointment of a collector of customs to succeed the said George H. Cochrane. Presented 20th January, 1913.—*Mr Emmerson*.. .. ..*Not printed.*

61*hhhh*. Return to an Order of the House of the 22nd January, 1912, for a copy of all correspondence, documents, recommendations and reports respecting the dismissal of C Michaud, postmaster at St. Germain, Kamouraska, and the appointment of his successor. Presented 20th January, 1913.—*Mr. Lapointe (Kamouraska)*.. ..*Not printed.*

61*iiii*. Return to an Order of the House of the 25th March, 1912, for a copy of all letters, telegrams and other documents, and of all complaints or accusations relating in any manner to the dismissal of Mr. Emile Archambault, letter carrier of Montreal, and a copy of the inquiry, and of the report of the inquiry held. Presented 20th January, 1913.—*Mr. Seguin*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61*jjjj*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Norman Morrison, postmaster at Ferguson's Lake, Richmond County, N.S. Presented 21st January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*kkkk*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of D. J. McKillop, postmaster at McKillop, Richmond County, N.S. Presented 21st January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*llll*. Return to an Order of the House of the 22nd January, 1912, for a copy of all correspondence, papers and reports in connection with the investigation recently held at the Ste. Agathe post office, County of Terrebonne. Presented 21st January, 1913.—*Mr. Lemieux*.. .. ..*Not printed.*

61*mmmm*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Bertie Boudrot, lightkeeper at Poulamon, Richmond County, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin in regard to the same, and a detailed statement of the expenses of such investigation, and a copy of all papers relating to the appointment of his successor. Presented 22nd January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*nnnn*. Return to an Order of the House of the 1st April, 1912, for a copy of all letters, telegrams and other documents and of all complaints, accusations and requests for inquiry, relating in any manner to the lighthouse keepers of Repentigny, P.Q., Messrs. Leon Rivest, J. B. Lachapelle and Louis Dubois, since 21st September last; also a copy of the inquiry and the report of the inquiry held in the matter. Presented 22nd January, 1913.—*Mr. Seguin*.. .. ..*Not printed.*

61*oooo*. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, telegrams, letters, &c., relating to the dismissal of L. P. Carignan, forest ranger in the constituency of Champlain, Quebec. Presented 24th January, 1913.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

61*pppp*. Return to an Order of the House of the 5th December, 1912, for a copy of all correspondence, complaints, petitions, memoranda, notes of evidence, letters, reports of investigations and other documents in the possession of the Department of Customs, relating to the dismissal of James S. Harvey, preventive officer, New Richmond, Quebec; W. L. Kempffer, preventive officer at Paspebiac, Quebec; J. Herbert Sweetman, preventive officer at Port Daniel, Quebec; J. B. Le Blanc, preventive officer, at Carleton, Quebec; J. Nadeau, preventive officer, Nouvelle, Quebec, as well as a copy of all recommendations made regarding the appointment of their various successors and the names, salaries, duties and residences, with a copy of their instructions. Presented 24th January, 1913.—*Mr. Marcil*.. .. ..*Not printed.*

61*qqqq*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of William Marsh, preventive officer at Little Pond, Sydney Mines, in the riding of North Cape Breton and Victoria. Presented 24th January, 1913.—*Mr. McKenzie*. *Not printed.*

61*rrrr*. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, letters, telegrams, and petitions, for and against the dismissal of Duncan McDonald, preventive officer of customs at Athelstan, County of Huntingdon; also a copy of the report of investigation and evidence submitted to investigating commissioner. Presented 24th January, 1913.—*Mr. Robb*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61*ssss*. Return to an Address to His Royal Highness the Governor General of the 11th December, 1912, for a copy of all papers, documents, orders in council, telegrams, letters, &c., relating to the dismissal from office of Lemuel Bent, late Collector of Customs at Oxford, N.S. Presented 24th January 1913.—*Mr. Maclean (Halifax).* *Not printed.*

61*tttt*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Pascal Poirier, Collector of Customs at Descouse, Richmond County, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin in regard to the same and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 24th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*uuuu*. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, letters, telegrams, reports and other documents concerning the dismissal of Donald J. Hachey, Collector of Customs at Bathurst, County of Gloucester, and the appointment of his successor. Presented 24th January, 1913.—*Mr. Turgeon.* *Not printed.*

61*vvvv*. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all correspondence, orders in council, and all other papers or documents in any way relating to the dismissal of John Maher, from the service of the Customs Department at Montreal. Presented 24th January, 1913.—*Mr. Murphy*.. .. ..*Not printed.*

61*wwww*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Peter Fougère, preventive and customs officer at Petit de Grat, Richmond county, N.S., and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same, and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 24th January, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61*xxxx*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of James Grantmyre, preventive officer at Little Bras D'or, N.S., in the riding of North Cape Breton and Victoria. Presented 24th January, 1913.—*Mr. McKenzie.* *Not printed.*

61*yyyy*. Return to an Order of the House of the 15th January, 1913, for a return showing all the employees on the Soulanges Canal who have been dismissed from their duties since the 21st September, 1911, by whom each of these employees has been replaced, and for what causes were they dismissed. Presented 27th January,1913.—*Mr. Boyer*.. .. ..*Not printed.*

61*zzzz*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Andrew Melville, locktender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Proulx*.. .. ..*Not printed.*

61*aaaaa*. Return to an Order of the House of 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of George Short, canal bridgetender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Guthrie*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

G1*bbbbb*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of N. Broderick, locktender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. McMillan*.. .. ..*Not printed.*

G1*ccccc*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Thomas McLatchie, locktender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Graham*.. .. ..*Not printed.*

G1*ddddd*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Elgin McLaughlin, locktender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Emmerson*.. .. ..*Not printed.*

G1*eeeee*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Robert Robertson, locktender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Lemieux*.. .. ..*Not printed.*

G1*fffff*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of William L. Gladstone, locktender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Pugsley*.. .. ..*Not printed.*

G1*ggggg*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Byron VanCamp, locktender at Cardinal, Ontario. Presented 7th January, 1913.—*Mr. Murphy*.. .. ..*Not printed.*

G1*hhhhh*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Samuel English, canal bridge tender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Carvell*.. .. ..*Not printed.*

G1*iiiii*. Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Edward F. Moran, locktender at Cardinal, Ontario. Presented 27th January, 1913.—*Mr. Oliver*.. .. ..*Not printed.*

G7*jjjjj*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters correspondence, documents and reports relating to the dismissal of William R. Fougere, of Frankville, Antigonish County, N.S., a sectionman on the Intercolonial railway, and for a statement in detail of the expenses connected with the investigations of the charges against him. Presented 27th January, 1913.—*Mr. Chisholm (Antigonish)*. *Not printed.*

G1*kkkkk*. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, correspondence, documents and reports relating to the dismissal of John Melanson, of Afton, Antigonish County, N.S., a sectionman on the Intercolonial railway, and for a statement in detail of the expenses connected with the investigation of the charges against him. Presented 27th January, 1913.—*Mr. Chisholm (Antigonish)*. *Not printed.*

G1*lllll*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Ronald D. McDonald, fishery overseer, at Broad Cove, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 27th January, 1913.—*Mr. Chisholm (Inverness)*. *Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61*mmmmm*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John McLean, fishery officer at Gabarouse, Cape Breton South, N.S., and of evidence taken and reports of investigations held by H. P. Duchemin, in regard to the same. Presented 27th January, 1913.—*Mr. Carroll*.. .. ..*Not printed.*

61*nnnnn*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of A. R. Forbes, fishery overseer at North Sydney, Nova Scotia in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 27th January, 1913.—*Mr. McKenzie.* *Not printed.*

61*ooooo*. Return to an Order of the House of the 15th January, 1913, for a copy of all correspondence, letters, telegrams, complaints, petitions, and other documents concerning the dismissal of Sebastien Savoie, superintendent of the lobster hatchery at Shippigan, Gloucester County, N.B., and the appointment of his successor. Presented 27th January, 1913.—*Mr. Turgeon*.. .. ..*Not printed.*

61*ppppp*. Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of D. S. Hendsbee, weigher, reduction works, Canso, Guysborough County, N.S., and of all evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 27th January, 1913.—*Mr. Sinclair*.. .. ..*Not printed.*

61*qqqqq*. Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of M. Muce, lightkeeper at Cheticamp Island, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 29th January, 1913.—*Mr. Chisholm (Inverness)*.. .. .. ..*Not printed.*

61*rrrrr*. Return to an Order of the House of the 15th January, 1913, for a copy of all papers, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Dr. J. D. R. Williams, collector of canal tolls at Cardinal, Ontario, and of the appointment of his successor. Presented 30th January, 1913.—*Mr. McMillan*.. .. ..*Not printed.*

61*sssss*. Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of John W. Bohan, preventive officer at Bath, Carleton County, N.B. Presented 3rd February, 1913. *Mr. Carvell*.. .. ..*Not printed.*

61*ttttt*. Return to an Order of the House of the 15th January, 1913, for a copy of all papers documents, correspondence, &c., relating to the dismissal of J. V. Smith, sub-collector of customs at Wood's Harbour, Shelburne County, N.S. Presented 3rd February, 1913. —*Mr. Law*.. .. ..*Not printed.*

61*uuuuu*. Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of John Y. Fleming, customs officer at Debec, Carleton County, N.B. Presented 3rd February, 1913.—*Mr. Carvell*.. .. ..*Not printed.*

61*vvvvv*. Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of Matthias Meagher, preventive officer at Debec, Carleton County, N.B. Presented 3rd February, 1913.—*Mr. Carvell*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61*wwwww*. Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence, letters, telegrams, complaints, and of the evidence given at investigation, if one was held, relating to the dismissal of Mr. A. J. Gosselin, acting preventive officer of customs at St. Albans, Vermont, through the port of St. Armand, County of Missisquoi. Presented 4th February, 1913.—*Mr. Kay*.. .. ..*Not printed.*

61*xxxxx*. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, letters, telegrams, and petitions for and against the dismissal of James W. Bannon, preventive officer of customs at St. Agnes de Dundee, County of Huntingdon also a copy of the report of investigation and evidence, if any, submitted to investigating commissioner. Presented 4th February, 1913.—*Mr. Robb*.. .. ..*Not printed.*

61*yyyyy*. Return to an Order of the House of the 4th December, 1912, for a return showing the number of postmasters that have been dismissed in the County of Pictou since 1st October, 1911; the names of the postmasters who have been appointed to succeed them; the causes of the dismissals and all complaints and correspondence with respect to same, and of all reports of investigation where investigations have been held. Presented 4th February, 1913.—*Mr. Macdonald*.. .. ..*Not printed.*

61*zzzzz*. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all correspondence, orders in council, and all other papers or documents in any way relating to the dismissal of James Murphy from the position of postmaster at Tweed, Ontario. Presented 4th February, 1913.—*Mr. Murphy*.. .. ..*Not printed.*

61 (6*a*). Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of H. B. Easton, immigration agent at Prescott, Ontario. Presented 4th February, 1913.—*Mr. Murphy*.. .. ..*Not printed.*

61 (6*b*). Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of B. Hughes, immigration agent at Prescott, Ontario. Presented 4th February, 1913.—*Mr. Oliver*.. .. ..*Not printed.*

61 (6*c*). Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of George Walsh, immigration agent at Prescott, Ontario. Presented 4th February, 1913.—*Mr. Oliver*.. .. ..*Not printed.*

61 (6*d*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of Newton S. Dow, immigration agent at McAdam Junction, York County, N.B. Presented 4th February, 1913.—*Mr. Carvell*.. .. ..*Not printed.*

61 (6*e*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of Oliver Hemphill, immigration agent at Debec, Carleton County, N.B. Presented 4th February, 1913.—*Mr. Carvell*.. .. ..*Not printed.*

61 (6*f*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Martin Johnston, preventive officer at Rea Islands, Richmond County, N.S Presented 6th February, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (6*g*). Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, letters, telegrams and other documents respecting the dismissal of J. E. Phaneuf, postmaster of St. Hugues, County of Bagot. Presented 6th February, 1913.—*Mr. Marcile*.. .. ..*Not printed*

61 (6*h*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Murdock McCutcheon, postmaster at Sonora, Guysborough County, N.S., and of all evidence taken and report of investigation held by Mr. H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 6th February, 1913.—*Mr. Sinclair*.. .. ..*Not printed*

61 (6*i*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Duncan Gillies, fishery overseer at Baddeck, C.B., in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 7th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61 (6*j*). Return to an Order of the House of the 9th December, 1912, for a copy of all complaints, accusations, correspondence, petitions and of all documents and reports respecting the dismissal of Antonio Leduc, postmaster of St. Timothée, in the County of Beauharnois and the appointment of his successor. Presented 7th February, 1913.—*Mr. Papineau*.. .. ..*Not printed.*

61 (6*k*). Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of the recommendation to council, the order in council, all correspondence with the government or any member thereof, and of all letters, documents and papers in any way connected with the dismissal of Charles Arthur Bowman from the engineering branch of the Department of Railways and Canals.—*Mr. Clark (Red Deer)*.. .. ..*Not printed.*

61 (6*l*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, evidence, reports, letters, correspondence, &c., relating to the dismissal of Elnathan D. Smith, fishery overseer, Shag Harbour, Shelburne County, N.S. Presented 11th February, 1913.—*Mr. Law*.. .. ..*Not printed.*

61 (6*m*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Donald McAulay, lightkeeper, Plaister, Baddeck Bay, C.B., riding of North Cape Breton and Victoria, and of the evidence taken and reports of investigation held by H. P. Duchemin in regard to the same, and a detailed statement of the expenses of such investigation. Presented 11th February, 1913.—*Mr. McKenzie.* *Not printed.*

61 (6*n*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, letters, correspondence, &c., relating to the dismissal of John Fredericks, lightkeeper at East Jordan, Shelburne County, N.S. Presented 11th February, 1913.—*Mr. Law*.. .. ..*Not printed.*

61 (6*o*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, letters, correspondence, &c., relating to the dismissal of John Fredericks, wharfinger at East Jordan, Shelburne County, N.S. Presented 11th February, 1913.—*Mr. Law*.. .. ..*Not printed*

CONTENTS OF VOLUME 27—*Continued.*

G1 (6*p*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, letters, correspondence, &c., relating to the dismissal of John C Morrison, harbour master at Shelburne, N.S. Presented 11th February, 1913.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

G1 (6*q*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Captain Roderick McDonald, tide waiter, at Big Bras D'Or, riding of North Cape Breton and Victoria, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin in regard to the same, and a detailed statement of the expenses of such investigation. Presented 11th February, 1913.—*Mr. McKenzie.*
Not printed.

G1 (6*r*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of James Maloney, customs officer at Dingwall, riding of North Cape Breton and Victoria, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin in regard to the same, and a detailed statement of the expenses of such investigation. Presented 11th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

G1 (6*s*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Hugh D. McEachern, customs officer at north side East Bay, Cape Breton, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 11th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

G1 (6*t*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, evidence, reports and correspondence relating to the dismissal of Thos. H. Hall, sub-collector of customs at Sheet Harbour, N.S. Presented 11th February, 1913.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

G1(6*u*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of J. A. McNeil, customs officer at Grand Narrows, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 11th February, 1913.—*Mr. McKenzie.*
Not printed.

G1 (6*v*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of George Burchell, custom house officer at Sydney Mines, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 11th February, 1913.—*Mr. McKenzie.*
Not printed.

G1 (6*w*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of W. H. Saver, collector of customs at Cardinal, Ont., and the appointment of his successor. Presented 11th February, 1913.—*Mr. McMillan.*
Not printed.

CONTENTS OF VOLUME 27—*Continued.*

61 (6*x*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, telegrams and other documents relative to the dismissal of Captain George Livingstone, custom officer at Big Bras D'Or, Cape Breton, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same and a detailed statement of the expenses of such investigation. Presented 11th February, 1913.—*Mr. McKenzie.*
Not printed.

61 (*y*). Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, reports and other documents and papers relating to the dismissal of H. Lacasse, as postmaster at Wendover, County of Prescott, Ontario, and the appointment of his successor. Presented 13th February, 1913.—*Mr. Proulx.. ..Not printed*

61 (6*z*). Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence and other papers connected with the removal of Harry A. Drigg, from the position of postmaster at Grassey Lake, Alberta. Presented 13th February, 1913.—*Mr. Buchanan.. .. ..Not printed*

61 (7*a*). Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all papers, memoranda, orders in council, and correspondence relating to the dismissal of A. H. Stratton, late postmaster at Peterborough, Ont. Presented 17th February, 1913.—*Mr. Maclean (Halifax).*
Not printed

61 (7*b*). Return to an Order of the House of the 10th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Henry Burrell, postmaster, Yarmouth North, Yarmouth County, N.S., and the same information regarding the appointment of Henry Burrell's successor, and of the evidence taken and report of investigation held by Charles Lane in regard to the same, also a detailed statement of expenses of such investigation. Presented 18th February, 1913.—*Mr. Law.. .. ..Not printed.*

61 (7*c*). Return to an Order of the House of the 4th December, 1912, for a return showing all the postmasters dismissed by the present government in the County of Gloucester, the names of such persons, the reasons for their dismissal, nature of the charges made against them; also a copy of all correspondence connected with it, and reports of investigations in cases where such investigations were instituted. Presented 18th February, 1913.—*Mr. Turgeon.. .. ..Not printed.*

61 (7*d*). Return to an Order of the House of the 10th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Dr. Charles A. Webster, port physician at Yarmouth, County of Yarmouth N.S., and the same information regarding the appointment of Dr. Webster's successor. Presented 18th February, 1913.—*Mr. Law.. .. ..Not printed*

61 (7*e*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, papers, charges and correspondence between the Department of Marine and Fisheries and all other persons, regarding the dismissal of Jos. Lord, keeper of lighthouses at Pointe à la Mule on the River Richelieu, Parish of St. Blaise, County of Saint Jean and Iberville and of all reports thereon with reference to the dismissal of the said Mr. Lord. Presented 19th February, 1913.—*Mr. Demers.. .. .. ..Not printed.*

61 (7*f*). Return to an Order of the House of the 15th January, 1913, for a copy of all correspondence, letters, telegrams and petitions concerning the dismissal of Henri Friolet, wharfinger at Caraquet, and Richard Southwood, wharfinger and agent of the Storm Signal Service at Bathurst, Gloucester County, N.B., and the appointment of their successors. Presented 19th February, 1913.—*Mr. Turgeon.. .. .. ..Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (7*g*). Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, letters, telegrams, reports and other documents, respecting the removal of Joseph L. Robichaud, lighthouse keeper at Miscou, County of Gloucester and the appointment of his successor; also of all correspondence respecting the engagement of the engineer of fog alarm system attached to that station, and the certificates required by the Minister of Marine, showing the competence of that engineer; with the names of the new keeper and of the said engineer and their ages. Presented 19th February, 1913.—*Mr. Turgeon*.. .. ..*Not printed.*

61 (7*h*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Captain Pope as lighthouse keeper at Scatarie, Cape Breton South, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same. Presented 19th February, 1913.—*Mr. Carroll*.. .. ..*Not printed*

61 (7*i*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Captain W. W. Lewis, as shipping master at Louisburg, Cape Breton South, Nova Scotia, and of evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same. Presented 19th February, 1913.—*Mr. Carroll.*
Not printed.

61 (7*j*). Return to an Order of the House of the 4th December, 1912, for a return showing the names of postmasters that have been dismissed in the County of Bonaventure since 1st October, 1911; the names of the postmasters who have been appointed to succeed them; the causes of the dismissals and a copy of all complaints and correspondence with respect to same, and of all reports of investigations where such have been held, with the reasons given for not holding any such investigation, when not held. Presented 19th February, 1913.—*Mr. Marcil*.. .. ..*Not printed*

61 (7*k*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of George Hines, lighthouse keeper at South Ingonish, riding of North Cape Breton and Victoria, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same, and a detailed statement of the expenses of such investigation. Presented 20th February, 1913.—*Mr. McKenzie*..*Not printed.*

61 (7*l*). Return to an Order of the House of the 15th January, 1913, for a return showing a list of the lighthouse keepers removed by the present government in the County of Two Mountains, the names of such persons, the reasons for their dismissal, the nature of the complaints made against them; also a copy of all correspondence and petitions relating thereto, and reports of inquiries in the cases, where such have been held; and also the names of their successors. Presented 20th February, 1913.—*Mr. Ethier*.. .. ..*Not printed.*

61 (7*m*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Archibald McDonald, preventive officer at Mull River, Inverness County, Nova Scotia. Presented 20th February, 1913.—*Mr. Chisholm (Inverness)*..*Not printed.*

61 (7*n*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, correspondence on file referring to the dismissal of Donald Chisholm, of Tracadie, in the County of Antigonish, as preventive officer. Presented 20th February. 1913.—*Mr. Chisholm (Antigonish)*... .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (7*o*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, telegrams, reports and other documents relative to the dismissal of Edward C. Humphreys, of Trenton, N.S., as an officer of the Inland Revenue Department and to the appointment of his successor. Presented 20th February, 1913.—*Mr. Macdonald* *Not printed.*

61 (7*p*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of H. J. Fixott, port physician at Arichat, Richmond County, N.S. Presented 21st February, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61 (7*q*). Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, letters, telegrams and other documents relating to the dismissal of D. Morin as postmaster of St. Pie de Bagot, County of Bagot. Presented 21st February, 1913.—*Mr. Marcil (Bagot)*.. .. ..*Not printed*

61 (7*r*). Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, investigations and papers generally concerning the dismissal of Ernest Paquin, postmaster of St. Cecile de Levrard, County of Nicolet. Presented 21st February, 1913.—*Mr. Lemieux*.. .. ..*Not printed*

61 (7*s*). Return to an Address to His Royal Highness the Governor General of the 17th February, 1913, for a copy of all complaints and charges made against John R. McDonald, Indian agent at Heatherton, Antigonish County, of the recommendations to council and of the order in council made thereon, and of all letters, correspondence and documents connected in any way with his dismissal. Presented 25th February, 1913.—*Mr. Chisholm (Antigonish)*... .. ..*Not printed*

61 (7*t*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Joseph Day, customs officer at Little Bras D'Or, C.B., in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 25th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61 (7*u*). Return to an Address to His Royal Highness the Governor General of the 29th January, 1913, for a copy of all complaints against Duncan McLeod, appraiser of customs at Sherbrooke, Province of Quebec, of all information obtained as to his conduct through seizures of goods by special officers of customs and by investigation; of all reports of investigation; of the order in council dismissing said Duncan McLeod, and of all correspondence between him and the Department of Customs. Presented 25th February, 1913.—*Mr. McCrae*.. .. ..*Not printed.*

61 (7*v*). Return to an Order of the House of the 17th February, 1913, for a copy of all papers, letters, telegrams, evidence, &c., given at the investigation or investigations and of reports of such investigations, relating to the dismissal of Edouard D Chiasson, sub-collector of customs at Lamèque, Gloucester County, and the appointment of his successor. Presented 25th February, 1913.—*Mr. Turgeon*.. ..*Not printed.*

61 (7*w*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of George F. Briggs, customs officer at McAdam Junction, York County, N.B. Presented 25th February, 1913.—*Mr. Carvell*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (7*x*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of William A. Duan, lightkeeper at Green Island, Richmond County, Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 25th February, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61 (7*y*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, charges, correspondence, letters, telegrams and other documents relating to the dismissal of Thomas Cameron, preventive officer at Andover, N.B., and of the evidence taken and reports of investigation held by Mr. E. T. C. Knowles, in connection with the same. Presented 26th February, 1913.—*Mr. Michaud*.. .. ..*Not printed.*

61 (7*z*). Return to an Order of the House of the 29th January, 1913, for a copy of all complaints and charges made against Joseph McDonald, late of the customs office at Sydney, Cape Breton, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal and the appointment of his successor. Presented 26th February, 1913.—*Mr. Carroll*.. .. ..*Not printed*

61 (8*a*). Return to an Order of the House of the 29th January, 1913, for a copy of all complaints and charges made against Angus McGillivray, late of customs office at Glace Bay, Cape Breton South, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal and the appointment of his successor. Presented 26th February, 1913.—*Mr. Carroll*.. .. ..*Not printed.*

61 (8*b*). Return to an Order of the House of the 3rd February, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Roderick Bain, boatman at New Campbellton, riding of North Cape Breton and Victoria, N.S., and of the evidence taken and reports of the investigation held by H. P. Duchemin, in regard to same, with a detailed statement of expenses of such investigation. Presented 26th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61 (8*c*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of W. A. Scott, lockmaster at Cardinal, Ontario, and of the appointment of his successor. Presented 27th February, 1913.—*Mr. McMillan.*
Not printed.

61 (8*d*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Bert Johnson, lockman at Nicholson, Ontario. Presented 27th February, 1913.—*Mr. Turgeon*.. .. ..*Not printed.*

61 (8*e*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of John Merrifield, lockmaster at Burritts Rapids, Ont., and the appointment of his successor. Presented 27th February, 1913.—*Mr. Chisholm.*
Not printed.

61 (8*f*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Neil Cummings, lockmaster at Cardinal, Ontario, and of the appointment of his successor. Presented 27th February, 1913.—*Mr. McMillan*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (8*g*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, papers, charges and correspondence between the Department of Railways and Canals and all other persons, regarding the dismissal of Mr. François Chagnon, lockkeeper at Saint Jean, County of Saint Jean and Iberville, and of all reports thereon with reference to the dismissal of the said Mr. Chagnon. Presented 27th February, 1913.—*Mr. Demers*.. .. ..*Not printed.*

61 (8*h*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Neil McNeil, bridge tender, Intercolonial railway, at Grand Narrows in the riding of North Cape Breton and Victoria. Presented 27th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61 (8*i*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Archibald McKenzie, sectionman, Intercolonial railway, at Grand Narrows, in the riding of North Cape Breton and Victoria. Presented 27th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61 (8*j*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of John Fraser, bridge tender, Intercolonial railway, at Grand Narrows, in the riding of North Cape Breton and Victoria. Presented 27th February, 1913.—*Mr. McKenzie*.. .. ..*Not printed.*

61 (8*k*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Demetrius Crozier, lockman at Merrickville, Ontario. Presented 27th February, 1913.—*Mr. Proulx*.. .. ..*Not printed.*

61 (8*l*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Patrick Cussuk, lockman at Merrickville, Ontario Presented 27th February, 1913.—*Mr. Michaud*.. .. ..*Not printed.*

61 (8*m*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Joseph H. Webster, lockman at Nicholson, Ontario. Presented 27th February, 1913.—*Mr. Pacaud*.. .. ..*Not printed.*

61 (8*n*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Cyrus O'Neil, lockman at Nicholson, Ontario. Presented 27th February, 1913.—*Mr. Kyte*... .. ..*Not printed.*

61 (8*o*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Michael Laughtin, bridgeman at Burritts Rapids, Ontario. Presented 27th February, 1913.—*Mr. Papineau*.. .. ..*Not printed.*

61 (8*p*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of John McKay, bridgeman at Becketts, Ontario. Presented 27th February, 1913.—*Mr. Lanctot*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (8*q*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Edward Proctor, lockman at Burritts Rapids, Ont. Presented 27th February, 1913.—*Mr. Neely*.. .. ..*Not printed.*

61 (8*r*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of William Morrison, lockman at Burritts Rapids, Ont. Presented 27th February, 1913.—*Mr. Cash*.. .. ..*Not printed.*

61 (8*s*). Return to an Order of the House of the 15th January, 1913, for a copy of all letters, documents, telegrams, reports, correspondence and recommendations in any way relating to the dismissal of Adam Henderson, bridgemaster at Cardinal, Ontario. and of the appointment of his successor. Presented 27th February, 1913.—*Mr. Murphy.* *Not printed.*

61 (8*t*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of James Feehan, fishery guardian or warden at Tracadie Harbour and Savage Harbour, Prince Edward Island. Presented 27th February, 1913.—*Mr. Hughes (Kings, P.E.I.)*.. .. ..*Not printed.*

61 (8*u*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of John C. McNeil, lighthouse keeper at Grand Narrows, in the riding of North Cape Breton and Victoria. Presented 27th February, 1913.—*Mr. McKenzie.* *Not printed.*

61 (8*v*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of A. A. Chisholm, fishery overseer at Margaree Forks, Inverness County, Nova Scotia. Presented 28th February, 1913.—*Mr. Chisholm (Inverness)*.. ..*Not printed.*

61 (8*w*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Charles E. Aucoin, collector of customs at Cheticamp, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by Mr. H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish).* *Not printed.*

61 (8*x*). Return to an Order of the House of the 17th February, 1913, for a copy of all complaints and charges made against Charles L. Gass, late postmaster at Bayfield. Antigonish County, of the evidence taken, if any, before Commissioner Duchemin, and of his report thereon and of all letters, telegrams and documents of every kind relating to his dismissal and the appointment of his successor. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed.*

61 (8*y*). Return to an Order of the House of the 17th February, 1913, for a copy of all letters and correspondence exchanged in reference to the dismissal of Cyprien Martin. of St. Basile, County of Madawaska, N.B., between the Department of Customs and the said Mr. Martin as preventive officer. Presented 28th February, 1913.—*Mr. Michaud*.. .. ..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

G1 (8*z*). Return to an Order of the House of the 9th December, 1912, for a copy of all complaints and charges made against Angus A. Boyd, postmaster at Boyd's post office, Antigonish County, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal, and the appointment of a successor. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed*

G1 (9*a*). Return to an Order of the House of the 9th December, 1912, for a copy of all complaints and charges made against John B. Macdonald, postmaster at Glasburn, Antigonish County, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal, and the appointment of a successor. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed*

G1 (9*b*). Return to an Order of the House of the 9th December, 1912, for a copy of all complaints and charges made against Alex. G. Chisholm, postmaster at Ohio, Antigonish County, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal, and the appointment of a successor. Presented 28th February, 1913.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed*

G1 (9*c*). Return to an Order of the House of the 9th December, 1912, for a copy of all complaints and charges made against John J. McLean, postmaster at Cross Roads, Ohio, Antigonish County, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal and the appointment of a successor. Presented 28th February, 1913.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed*

G1 (9*d*). Return to an Order of the House of the 9th December, 1912, for a copy of all complaints and charges made against Dougald McDonald, postmaster at Doctors Brook, Antigonish County, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to his dismissal, and the appointment of his successor. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed.*

G1 (9*e*). Return to an Order of the House of the 9th December, 1912, for a copy of all complaints and charges made against Dan. A. McInnes, postmaster at Georgeville, Antigonish County, Nova Scotia, and of all letters, telegrams, and correspondence relating in any way to his dismissal, and the appointment of his successor. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed.*

G1 (9*f*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, letters, correspondence, telegrams and other documents relating to the dismissal of E. A. Asker, harbour master at Campbellton. Presented 3rd March, 1913.—*Mr. Reid (Restigouche)*.. .. ..*Not printed.*

G1 (9*g*). Return to an Order of the House of the 10th February, 1913, for a copy of all papers, letters, documents and orders relative to the dismissal of Fred Shultz as caretaker of the armouries at Kentville, Nova Scotia, and of the appointment of William Sloop in his place and also for a statement of the stores in said armouries in the years 1910, 1911, 1912, respectively, and for a copy of all orders and regulations relative to the duties of such caretaker. Presented 3rd March, 1913.—*Mr. Macdonald. Not printed.*

G1 (9*h*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Dr. Freeman O'Neil, from the Marine Hospital a Louisburg, Cape Breton South, N.S., and of evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same. Presented 10th March, 1913.—*Mr. Carroll*..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (9*i*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Leon N. Poirier, wharfinger at Descouse, Richmond County, N.S. Presented 10th March, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

61 (9*j*). Return to an Order of the House of the 10th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Norman L. Trefry, shipping master at Yarmouth, County of Yarmouth, N.S., and the same information regarding the appointment of Mr. Trefry's successor Presented 10th March, 1913.—*Mr. Law*.. .. ..*Not printed.*

61 (9*k*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, documents, correspondence, &c., relating to the dismissal of James Amereault, lighthouse keeper at New Edinburgh, Digby County, N.S. Presented 10th March, 1913.—*Mr. McLean (Halifax)*.. .. ..*Not printed*

61 (9*l*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, evidence, reports, letters, correspondence, &c., relating to the dismissal of H. B. Manley, a clerk in the Dominion Lands Office at Saskatoon. Presented 10th March, 1913.—*Mr. McCraney*.. .. ..*Not printed*

61 (9*m*). Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence, letters, telegrams, papers and other documents in connection with the dismissal of John Spicer, senior assistant of the Moosejaw Land Agency. Presented 10th March, 1913.—*Mr. Knowles*.. .. ..*Not printed.*

61 (9*n*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, letters, telegrams and other documents respecting the dismissal of Robert Pragnall from the position of agent of the Dominion Land Office at Swift Current and the appointment of his successor. Presented 10th March, 1913.—*Mr. Knowles.*
Not printed.

61 (9*o*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, evidence, reports, letters, correspondence, &c., relating to the dismissal of G. M. Ullyot, a clerk in the Dominion Lands Office at Saskatoon. Presented 10th March, 1913.—*Mr. McCraney*.. .. ..*Not printed*

61 (9*p*). Return to an Order of the House of the 9th December, 1912, for a return showing the detail and number of dismissals from public offices by the present government to this date in the riding of Saskatoon, with the names of the dismissed occupants, the reasons for their dismissals, the complaints against such officials, and all correspondence with respect to the same, and of all reports of investigations, in case where such were held. Presented 17th March, 1913.—*Mr. McCraney*.. .. ..*Not printed*

61 (9*q*). Return to an Order of the House of the 17th February, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports, affidavits and other documents in the Department of Inland Revenue, respecting the dismissal of J. N. Poirier, Collector of Excise at Victoriaville, County of Arthabaska, and the names of the witnesses interested, with a copy of the evidence and a statement of expenses of the said inquiry. Presented 17th March, 1913.—*Mr. Brouillard*.. .. ..*Not printed.*

61 (9*r*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of John G. Morrison, fishery inspector at Englishtown, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 18th March, 1913.—*Mr. Kyte*.. .. ..*Not printed*

CONTENTS OF VOLUME 27—*Continued.*

G1 (9*s*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Edward Landry, lightkeeper, Petite de Grat, Richmond County, N.S., and of all evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 18th March, 1913.—*Mr. Kyte*.. .. ..*Not printed.*

G1 (9*t*). Return to an Order of the House of the 27th January, 1913, for a copy of all documents, petitions, letters, correspondence, inquiries and reports concerning the dismissal of Evariste Talbot, employed in the general freight office of the Intercolonial. Presented 18th March, 1913.—*Mr. Lapointe* (*Kamouraska*).....*Not printed*

G1 (9*u*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Department of Railways or any department of the government, relating to the dismissal of Philip H. Ryan, an employee of the Intercolonial railway at Mulgrave, N.S., and if there was an investigation, the names of all witnesses examined, a copy of the evidence, and a detailed statement of the expenses of such investigation. Presented 18th March, 1913.—*Mr. Sinclair*..*Not printed.*

G1 (9*v*). Return to an Order of the House of the 3rd February, 1913, for a return showing how many postmasters and other post office employees were removed from office respectively, from the 1st of July, 1896, to the 1st of October, 1911, and the number in each province; and from the 10th of October, 1911, up to date, with the number in each province; also the number of post offices in operation in each province on the 1st July, 1896. Presented 26th March, 1913.—*Mr. Rainville*.....*Not printed.*

G1 (9*w*). Return to an Address to His Royal Highness the Governor General of the 3rd February, 1913, for a copy of all orders in council, and of all letters, telegrams, complaints, petitions and of all other documents of any kind, in the possession of the government, or of any department or official thereof, in any way relating to or concerning the dismissal of Dr. Clarence T. Campbell, post office inspector at London, Ontario. Presented 26th March, 1913.—*Mr. Ross*.....*Not printed.*

G1 (9*x*). Return to an Order of the House of the 9th December, 1912, for a return showing the number of postmasters that have been dismissed in the County of Missisquoi since 1st October, 1911, the names of the postmasters who have been appointed to succeed them, the cause of the dismissals and a copy of all complaints and correspondence with respect to the same, and of all reports of investigations where such have been held. Presented 26th March, 1913.—*Mr. Kay*.....*Not printed.*

G1 (9*y*). Return to an Order of the House of the 27th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Post Office Department, regarding any change in any post office or postmastership in Bonaventure County, between 5th December, 1912, up to date. Presented 26th March, 1913.—*Mr. Marcil* (*Bonaventure*).....*Not printed.*

G1 (9*z*). Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all papers, documents, correspondence, orders in council, &c., relative to the dismissal of S. A. Johnson, late postmaster at Petite Rivière, Lunenburg County, N.S. Presented 26th March, 1913.—*Mr. MacLean* (*Halifax*).
Not printed.

CONTENTS OF VOLUME 27—*Continued.*

61 (10*a*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of Murdock McKenzie, postmaster at Millville Boulardarie, Nova Scotia, in the riding of North Cape Breton and Victoria. Presented 26th March, 1913.—*Mr. McKenzie* ....*Not printed.*

61 (10*b*). Return to an Order of the House of the 9th December, 1912, for a copy of all documents, correspondence and telegrams relating to the dismissal of James Stewart, postmaster at Middleton, Antigonish County, and the appointment of his successor. Presented 26th March, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed*

61 (10*c*). Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence, telegrams and reports relating to the dismissal of Lauchlin McNeil, postmaster at New France, County of Antigonish, and the appointment of his suc- Presented 26th March, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

61 (10*d*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of Frank Dunlop, postmaster at Groves Point, Nova Scotia, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expense of such investigation. Presented 26th March, 1913.—*Mr. McKenzie.*

Not printed.

61 (10*e*). Return to an Order of the House of the 10th December, 1912, for a copy of all letters, telegrams, complaints, petitions and other documents relating to the investigation of A. W. Salsman, postmaster at Middle Country Harbour, N.S., and to the appointment of his successor. Presented 26th March, 1913.—*Mr. Sinclair.*

Not printed.

61 (10*f*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Richard Conroy, postmaster at Cross Roads, County Harbour, Guysborough County, N.S., and of all evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 26th March, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (10*g*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Abner Carr, postmaster at St. Francis Harbour, Guysborough County, N.S., and of all evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of expenses of such investigation. Presented 26th March, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (10*h*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Parker Sangster, postmaster, Upper New Harbour, Guysborough County, NS., and of all evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 26th March, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (10*i*). Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all correspondence, orders in council and all other papers or documents in any way relating to the dismissal of Alexander Marion, from the position of postmaster at Rockland, Ontario. Presented 26th March, 1913.—*Mr. Murphy* ....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (10*j*). Return to an Order of the House of the 4th December, 1912, for a copy of the evidence taken and the report made by each commissioner appointed since 1st of November, 1911, to conduct an investigation into charges of offensive partizanship made against postmasters in the County of Russell. Presented 26th March, 1913.—*Mr. Murphy* .....*Not printed.*

61 (10*k*). Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, evidence, reports, findings and correspondence, relating to the dismissal of Mathew Boutilier, recently postmaster at Mushaboom, Halifax County, N.S. Presented 26th March, 1913.—*Mr. MacLean (Halifax)*.....*Not printed*

61 (10*l*). Return to an Order of the House of the 29th January, 1913, for a return showing the names of the postmasters in the County of Joliette, who have been dismissed from 1896 to September, 1911; their respective parishes; dates of their dismissals; the reasons alleged; whether an inquiry was made in each case; on whose recommendation in each case the dismissals were made; names of successors in each case, and on whose recommendation were they appointed. Presented 26th March, 1913.—*Mr. Guilbault.* *Not printed.*

61 (10*m*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, evidence, reports, letters, correspondence, &c., relating to the dismissal of T. Doane Crowell, postmaster at Shag Harbour, Shelburne County, N.S., and the appointment of his successor. Presented 26th March, 1913.—*Mr. Law.* *Not printed*

61 (10*n*). Return to an Order of the House of the 22nd January, 1913, for a return showing the postmasters who have been dismissed in the County of Vaudreuil, the dates of their appointment, the cause of their dismissal and by whom their dismissal was requested. Presented 26th March, 1913.—*Mr. Boyer*.....*Not printed.*

61 (10*o*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, documents, letters, correspondence, &c., relating to the dismissal of Mrs. Spinney, postmistress at Upper Port La Tour, Shelburne County, N.S. Presented 26th March, 1913.—*Mr. Law*.....*Not printed.*

61 (10*p*). Return to an Order of the House of the 29th January, 1913, for a return showing the number of postmasters dismissed in the County of Rimouski since 21st September, 1911, giving their names. Presented 26th March, 1913.—*Mr. Lapointe (Kamouraska)* .....*Not printed.*

61 (10*q*). Return to an Order of the House of the 4th December, 1912, for a return showing the detail and number of dismissals from public offices by the present government to this date in the riding of Wright, giving the names of the dismissed occupants, the reasons for their dismissal, the complaints against such officials, and a copy of all correspondence with respect to the same, with all reports of investigations where such were held. Presented 27th March, 1913.—*Mr. Devlin*.....*Not printed*

61 (10*r*). Return to an Order of the House of the 29th January, 9113, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John R. McLennan, janitor of the public building at Inverness Town, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by Mr. H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 28th March, 1913.—*Mr. Chisholm (Inverness)*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (10*s*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, and other documents relating to the dismissal of James Arbuckle, caretaker of the public buildings at Pictou, and the appointment of two successors in his stead Presented 28th March, 1913.—*Mr. Macdonald*.....*Not printed.*

61 (10*t*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of Mary Dunlop, telegraph operator at Groves Point, Cape Breton County, Nova Scotia, in the riding of North Cape Breton and Victoria. Presented 28th March, 1913.—*Mr. McKenzie* .....*Not printed.*

61 (10*u*). Return to an Order of the House of the 4th December, 1912, for a return showing the foremen employed at the various public works in the County of Gloucester on the 21st of September, 1911, who have been dismissed since by the present administration, containing their names, reasons of dismissal, nature of the charges made against them, also a copy of all correspondence connected with the same and reports of inquiries, in cases where such inquiries have been instituted. Presented 28th March, 1913.—*Mr. Turgeon*.....*Not printed*

61 (10*v*). Return to an Order of the House of the 3rd February, 1913, for a copy of all letters, telegrams, papers and documents relative to the dismissal of Captain Lyons of the dredge *Northumberland*, and the appointment of his successor. Presented 28th March, 1913.—*Mr. Macdonald*.....*Not printed.*

61 (10*w*). Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all correspondence, orders in council and all other papers or documents in any way relating to the dismissal of James McCartin, from the position of inspector of the concrete work forming part of the contract for the construction of the The Plaza at the City of Ottawa Presented 28th March, 1913.—*Mr. Murphy* .....*Not printed.*

61 (10*x*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Robert C. Morrison, postmaster at St. Peters, Richmond County, N.S., and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation, together with a copy of all recommendations, letters, telegrams and other papers relating to the appointment of Mr. Morrison's successor. Presented 31st March, 1913.—*Mr. Kyte.* *Not printed*

61 (10*y*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of Richard Dugas, storm signal attendant at Alder Point, Nova Scotia, in the riding of North Cape Breton and Victoria. Presented 4th April, 1913.—*Mr. McKenzie.* *Not printed.*

61 (10*z*). Return to an Order of the House of the 20th January, 1913, for a return showing the names of all officials of the Marine and Fisheries Department who have been dismissed or removed in the County of Pictou, the reasons of the same, the evidence taken at any investigation held in regard to them, and the reports of said investigations, the names of their successors, and a copy of all letters, charges, complaints and recommendations from any person or persons in regard to the said removals or dismissals, or in regard to the appointment of their successors. Presented 4th April 1913.—*Mr. Macdonald*.....*Not printed*

CONTENTS OF VOLUME 27—*Continued.*

61 (11*a*). Return to an Order of the House of the 3rd March, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of William L. Munro, lightkeeper at White Head, Guysborough County, N.S., and of all evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 4th April, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (11*b*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, telegrams, correspondence, reports and documents touching the dismissals of Alexander R. McAdam as fishery officer for the County of Antigonish, N.S., and the appointment of his successor. Presented 4th April, 1913.—*Mr. Chisholm (Antigonish).* *Not printed.*

61 (11*c*). Return to an Order of the House of the 19th February, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Marine and Fisheries Department, or any department of the government, relating to the dismissal of Stephen C. Richard, lightkeeper at Charlos Cove, N.S., and if there was an investigation, the names of all witnesses examined, a copy of the evidence, and a detailed statement of the expenses of such investigation. Presented 4th April, 1913—*Mr. Sinclair*.....*Not printed.*

61 (11*d*). Supplementary to an Order of the House of the 7th February, 1912, for a return showing for each department of the government the names, post office addresses, offices, employment, and salaries of all persons employed either in the inside or outside service thereof, and of such persons not in the Civil Service, employed by the government in any department, on the tenth day of October, 1911, who have been removed from office or employment by dismissal; specifying in each case the manner of and grounds of such dismissals and the length of notice given to the persons removed, and also indicating in each case whether an inquiry was or was not held prior to such dismissal. Presented 7th April, 1913.—*Mr. Kyte*.....*Not printed.*

61 (11*e*). Return to an Order of the House of the 7th December, 1912, for a return showing the public officers removed by the present government in the district of Lotbinière, with the names and duties of such persons, the reasons of their dismissal, the nature of the complaints made against them, also a copy of all correspondence relating thereto and reports of inquiries in the cases where such inquiries have been held. Presented 9th April, 1913.—*Mr. Fortier*.....*Not printed*

61 (11*f*). Return to an Order of the House of the 29th January, 1913, for a copy of all complaints and charges made against Miss Gertie Lewis, as postmistress at Main-a-dieu, Cape Breton South, N.S., and of all letters, telegrams and correspondence relating in any way to her dismissal and the appointment of a successor. Presented 9th April, 1913.—*Mr. Carroll* .....*Not printed.*

61 (11*g*). Return to an Order of the House of the 11th December, 1912, for a copy of all correspondence, letters, telegrams and other documents relating to the dismissal of John Taylor, late postmaster at Carnduff, Sask., and of all reports of investigation held, &c. Presented 9th April, 1913.—*Mr. Turriff*.....*Not printed.*

61 (11*h*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Frederick Mitchell, from the position of postmaster at Dominion, Cape Breton South, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same. Presented 9th April, 1913.—*Mr. Carroll.* *Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (11*i*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers, letters, telegrams and other correspondence relating to the dismissal of Thomas J. Sears, postmaster at Lochaber, N.S., and the appointment of his successor; of the evidence taken, and of the report thereon made by Commissionor Duchemin, on the charges, if any, made against the dismissed postmaster. Presented 9th April, 1913.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed.*

61 (11*j*). Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence, letters, telegrams, papers and other documents in connection with the dismissal of the postmaster at Alsask, Saskatchewan. Presented 9th April, 1913.—*Mr. Knowles*..... ....*Not printed*

61 (11*k*). Return to an Order of the House of the 3rd March, 1913, for a copy of all letters, telegrams, instructions and other papers and documents in the possession of the Department of Marine and Fisheries, or any officer thereof, relating to the dismissal or appointment of fishery guardians or fishery officers, in the County of Guysborough, N.S., bearing date since the 10th day of October, 1911. Presented 9th April, 1913.—*Mr. Sinclair*..... .....*Not printed*

61 (11*l*). Return to an Order of the House of the 11th December, 1912, for a copy of all complaints and charges made against John R. Morrison, postmaster at Oban, Richmond County, N.S., and of all letters, telegrams and correspondence relating in any way to his dismissal, and the appointment of a successor. Presented 14th April, 1913.—*Mr. Kyte*..... ....*Not printed.*

61 (11*m*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of A. G. McDonald, postmaster of North East Margaree, Inverness County. Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 14th April, 1913.—*Mr. Chisholm (Inverness)*..*Not printed.*

61 (11*n*). Return to an Order of the House of the 9th December, 1912, for a return showing in detail the number of dismissals from public office by the present government to this date, in the constituency of Qu'Appelle, with the names of the dismissed officers, and the reason for their dismissal, the complaints against such officials and a copy of all correspondence, petitions, papers and documents with respect to the same, and of all notes of evidence and reports of investigations in cases where they have taken place. Presented 14th April, 1913.—*Mr. Thomson (Qu'Appelle)*.....*Not printed.*

61 (11*o*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Department of Marine and Fisheries or any department of the government, relating to the dismissal of David Reid, fishery officer at Port Hilford, N.S., and if there was an investigation, the names of the witnesses examined, a copy of the evidence, and a detailed statement of the expenses of each investigation. Presented 15th April, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (11*p*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Robert Musgrave, postmaster at North Sydney, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 15th April, 1913.—*Mr. McKenzie*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

G1 (11*q*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of A. D. Archibald, postmaster at Glenelg, Guysborough County, N.S., and of all evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 15th April, 1913.—*Mr. Chisholm* (*Inverness*).....*Not printed*

G1 (11*r*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Leon N. Poirier, postmaster at Descouse, Richmond County, N.S., and of the evidence taken and of the reports of investigation held by H. P. Duchemin in regard to the same and a detailed statement of the expenss of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 15th April, 1913. *Mr. Kyte*.....*Not printed.*

G1 (11*s*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Norman McAskill, postmaster at Framboise, Richmond County, N.S., and of the evidence taken and of the report of investigation held by H. P. Duchemin in regard to the same, and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 15th April, 1913.—*Mr. Kyte*.....*Not printed.*

G1 (11*t*). Return to an Order of the House of the 11th December, 1912, for a copy of all papers, documents and correspondence relating to the dismissal of A. T. Doucet, postmaster and collector of customs at Salmon River, Digby County, N.S. Presented 15th April, 1913.—*Mr. Maclean* (*Halifax*).. .. ..*Not printed.*

G1 (11*u*). Return to an Order of the House of the 29th January, 1913, for a copy of all complaints and charges made against Mrs. Annie Gallivan, as postmistress at Whitney Pier, Cape Breton South, Nova Scotia, and of all letters, telegrams and correspondence relating in any way to her dismissal and the appointment of a successor. Presented 15th April, 1913.—*Mr. Carroll*.....*Not printed.*

G1 (11*v*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Wm. J. Paquet, postmaster at Souris, P.E.I. Presented 15th April, 1913.—*Mr. Hughes* (*Kings, P.E.I.*).. .. ..*Not printed.*

G1 (11*w*). Return to an Order of the House of the 27th January, 1913, for a copy of all documents, correspondence, petitions and recommendations, &c., relating to the dismissal of the postmaster at St. Anaclet, County of Rimouski, during the year 1912, and of the appointment of his successor. Presented 15th April, 1913.—*Mr. Lapointe* (*Kamouraska*).. .. ..*Not printed*

G1 (11*x*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of George Gunn, postmaster at French Village, Prince Edward Island. Presented 15th April, 1913.—*Mr. Hughes* (*Kings, P.E.I.*).. .. ..*Not printed.*

G1 (11*y*). Return to an Order of the House of the 4th December, 1912, for a return showing the detail and number of dismissals from public offices by the present government to this date in the riding of Mackenzie, together with the names of the dismissed occupants, the reasons for their dismissal, the complaints against such officials, and a copy of all correspondence with respect to the same, and of all reports of investigations, where any such were held. Presented 15th April, 1913.—*Mr. Cash*..*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (11*z*). Return to an Order of the House of the 7th April, 1913, for a copy of all charges investigated by Commissioner W. J. Code, and also of the evidence taken and the report made by the said commissioner. Presented 16th April, 1913.—*Mr. Murphy.*
Not printed.

61 (12*a*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of D. F. McLean, fishery overseer at Port Hood, Inverness County, N.S., and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 16th April, 1913.—*Mr. Chisholm (Inverness).....Not printed*

61 (12*b*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of J. Scott Nelson, postmaster at Louisdale, Richmond County, N.S., and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same, and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 16th April, 1913. —*Mr. Kyte.....Not printed*

61 (12*c*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Joseph McMullen, from the post office at Bridgeport, Cape Breton South, Nova Scotia, and of evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same. Presented 16th April, 1913.—*Mr. Carroll....Not printed.*

61 (12*d*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Frederick A. Martell, postmaster at L'Ardoise, Richmond County, N.S., and of the evidence taken and of the reports of investigation held by H. P. Duchemin, in regard to the same, and a detailed statement of the expenses of such investigation; and a copy of all papers relating to the appointment of his successor. Presented 16th April, 1913.—*Mr. Kyte.....Not printed.*

61 (12*e*). Return to an Order of the House of the 11th December, 1912, for a copy of all representations, statements and complaints as to political activity made against John A. Macdonald, postmaster at McArras Brook, Antigonish County, and of all correspondence relating to the charges made against him and of the report of Commissioner Duchemin on said charges. Presented 16th April, 1913.—*Mr. Chisholm (Antigonish).....Not printed*

61 (12*f*). Return to an Address to His Royal Highness the Governor General of the 7th December, 1911, for a copy of all papers, correspondence and orders in council in connection with and relating to the dismissal from office of public officials from each of the departments of government since the 1st day of October last past, including both Inside and Outside Service. Presented 18th April, 1913.—*Mr. Carvell.....Not printed.*

61 (12*g*). Return to an Address to His Royal Highness the Governor General of the 3rd March, 1913, for a copy of all papers, documents, correspondence, evidence, order in council, &c., relative to the dismissal of Edward Doucett, sub-collector of customs, Digby County, N.S. Presented 21st April, 1913.—*Mr. McLean (Halifax).*
Not printed.

61 (12*h*). Return to an Address to His Royal Highness the Governor General of the 3rd March, 1913, for a copy of all papers, documents, correspondence, evidence, orders in council, &c., relative to the dismissal of Mr. LeBlanc, sub-collector of customs, Church Point, Digby County, N.S. Presented 21st April, 1913. *Mr. McLean (Halifax).*
Not printed

CONTENTS OF VOLUME 27—*Continued.*

61 (12*i*). Return to an Order of the House of the 19th March, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John C. Bourinot, chief customs officer at Port Hawkesbury, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by Mr. H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 21st April, 1913.—*Mr. Chisholm* (*Inverness*).
Not printed.

61 (12*j*). Return to an Order of the House of the 31st March, 1913, for a copy of all charges, evidence, correspondence, letters and telegrams in the Department of Railways and Canals since the 21st day of September, 1911, relating to the dismissal of Alexander E. Morrison, Point Tupper, N.S., from the service of the Intercolonial railway, and of all recommendations for the appointment of his successor. Presented 21st April, 1913.—*Mr. Kyte*.. .. ..*Not printed*

61 (12*k*). Return to an Order of the House of the 3rd February, 1913, for a copy of all letters, telegrams, reports and other papers and documents received from the officers of the Canadian Brotherhood of Railway Employees, by the Department of Labour, or of the Department of Railways and Canals, between the 1st day of January, 1912, and the 25th day of January, 1913, relating to investigations and dismissals of employees for political partizanship, and of the replies thereto. Presented 22nd April, 1913.—*Mr. Sinclair*..... .....*Not printed.*

61 (12*l*). Return to an Order of the House of the 31st March, 1913, for a copy of all complaints and charges against James Falconer, of Newcastle, County of Northumberland, New Brunswick, as correspondent of the *Labour Gazette* at Newcastle, and of all letters, telegrams and other correspondence relating in any way to his dismissal and the appointment of a successor. Presented 22nd April, 1913.—*Mr. Loggie*..*Not printed.*

61 (12*m*). Return to an Order of the House of the 19th March, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John B. Chisholm, lightkeeper at Port Hastings, Inverness County, Nova Scotia, and the evidence taken and report of investigation held by Mr. H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 24th April, 1913.—*Mr. Chisholm* (*Inverness*).....*Not printed.*

61 (12*n*). Return to an Order of the House of the 7th April, 1913, for a copy of all correspondence, telegrams, charges and other documents, relating to the dismissal of Epiphane Nadeau, immigration agent at St. Leonard, Victoria County, N.B. Presented 25th April, 1913.—*Mr. Michaud*.. .. ..*Not printed.*

61 (12*o*). Return to an Order of the House of the 31st March, 1913, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of D. J. Morrison, boatman in the customs service at Big Bras D'or, North Cape Breton and Victoria, N.S., and of the evidence taken and of reports of the investigation held by H. P. Duchemin, in regard to the same, with a detailed statement of expenses of such investigation. Presented 25th April, 1913.—*Mr. McKenzie.*
Not printed

61 (12*p*). Return to an Order of the House of the 31st March, 1913, for a copy of all charges, correspondence, letters, telegrams, and other documents relative to the dismissal of Rod McLeod, boatman in the customs service at Big Bras D'or, North Cape Breton and Victoria, N.S., and of the evidence taken and of reports of the investigation held by H. P. Duchemin, in regard to the same, with a detailed statement of expenses of such investigation. Presented 25th April, 1913.—*Mr. McKenzie.*
Not printed.

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61 (12*q*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of D. McLachlin, postmaster at Marble Mountain, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 25th April, 1913.—*Mr. Chisholm (Inverness).. .. ..Not printed.*

61 (12*r*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Abram LeBlanc, postmaster at West Arichat, Richmond County, N.S., and of the evidence taken and reports of investigation held by H. P. Duchemin in regard to the same and a detailed statement of the expenses of such investigation, and a copy of all papers relating to the appointment of his successor. Presented 25th April, 1913.—*Mr. Kyte..... ....Not printed.*

61 (12*s*). Return to an Order of the House of the 11th December, 1912, for a copy of all correspondence, letters, telegrams and other documents relating to the dismissal of Charles J. Lafford, postmaster at Grand Grove, Richmond County, N.S., and of all evidence taken and report of investigation held by H. P. Duchemin in regard to the same; also a detailed statement of the expenses of such investigation. Presented 25th April, 1913.—*Mr. Kyte..... .....Not printed*

61 (12*t*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of W. S. Lawrence, postmaster at Margrave Harbour, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin. in regard to the same; also a detailed statement of the expenses of such investigation. Presented 25th April, 1913.—*Mr Chisholm (Inverness).. .. ..Not printed.*

61 (12*u*). Return to an Order of the House of the 11th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John K. McDonald, postmaster at Whycocomagh, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 25th April, 1913.—*Mr. Chisholm (Inverness).....Not printed*

61 (12*v*). Return to an Order of the House of the 31st March, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Captain P. J. Wilcox, from the customs office at Louisburg, Cape Breton South, Nova Scotia, and of evidence taken and reports of investigations held by H. P. Duchemin, in regard to the same. Presented 29th April, 1913.—*Mr. Carroll.*
Not printed

61 (12*w*). Return to an Order of the House of the 31st March, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of M. J. McKennon, from the customs office at Glace Bay, Cape Breton South, Nova Scotia, and of evidence taken and reports of investigation held by H. P. Duchemin, in regard to the same. Presented 29th April, 1913.—*Mr. Carvell.....Not printed*

61 (12*x*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Captain John Arsenault, telegraph line repairer at Alder Point, Cape Breton, in the riding of North Cape Breton and Victoria, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to same, and a detailed statement of the expenses of such investigation. Presented 29th April, 1913.—*Mr. McKenzie.*
Not printed.

CONTENTS OF VOLUME 27—*Continued.*

61 (12*y*). Return to an Order of the House of the 9th December, 1912, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Mrs. John Arsenault, telegraph operator at Alder Point, N.S., in the riding of North Cape Breton and Victoria. Presented 2nd May, 1913.—*Mr. McKenzie.*
Not printed

61 (12*z*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Department of Railways and Canals or any department of the government, relating to the dismissal of A. J. Wilkinson, at Mulgrave, N.S. and if there was an investigation, the names of all witnesses examined and a detailed statement of the expenses of such investigation. Presented 2nd May, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (13*a*). Charges made against Mr. H. A. Bayfield, superintendent of dredging, British Columbia.—(*Senate*).. .. ..*Not printed.*

61 (13*b*). Return to an Order of the House of the 31st March, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of H. G. McKay, lighthouse keeper at Bird Island, Big Bras D'or, North Cape Breton and Victoria, and of the evidence taken, and of reports of the investigation held by H. P. Duchemin, in regard to the same, with a detailed statement of expenses of such investigation. Presented 5th May, 1913.—*Mr. McKenzie*.....*Not printed.*

61 (13*c*). Return to an Order of the House of the 10th March, 1913, for a copy of all reports, charges, and correspondence in the office of the Department of Marine and Fisheries relating to charges of political partizanship against Michael O'Brien, lightkeeper at Bear Island, Richmond County, N.S., and of the instructions issued to H. P. Duchemin, commissioner, to investigate the same together with the Commissioner's report and finding thereon, and his expenses of holding such investigations. Presented 7th May, 1913.—*Mr. Kyte*.....*Not printed.*

61 (13*d*). Return to an Order of the House of the 17th February, 1913, for a copy of all correspondence, letters, telegrams, reports, recommendations and other documents bearing on or having relation to the dismissal of J. H. Leduc, as medical port officer of the port of Three Rivers, P.Q. Presented 7th May, 1913.—*Mr. Bureau*..*Not printed.*

61 (13*e*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Patrick Shea, postmaster at Tompkinsville, Guysborough County, N.S. Presented 7th May, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (13*f*). Return to an Order of the House of the 29th January, 1913, for a copy of all complaints and charges made against Elias Rawding, postmaster at Clementsport, Annapolis County, N.S., and of all letters, petitions, telegrams, and other correspondence relating in any way to his dismissal and the appointment of a successor. Presented 7th May, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (13*g*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Charles McLean, postmaster at Strathlorne, Inverness County, Nova Scotia. Presented 7th May, 1913.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed.*

61 (13*h*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Angus R. McDonald, postmaster at Broad Cove Chapel, Inverness County, Nova Scotia. Presented 7th May, 1913.—*Mr. Chisholm (Inverness)*.. ..*Not printed.*

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61 (13*i*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of John McPhail, postmaster at Scotsville, Inverness County, Nova Scotia. Presented 7th May, 1913.—*Mr. Chisholm (Inverness)*.....*Not printed.*

61 (13*j*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, telegrams, complaints, petitions or other documents of any kind received by the government, or any member or official thereof, relating to the conduct of J. Morgan, one time postmaster of the village of Ailsa Craig, Ontario, as such, and relating to an investigation into said conduct. Presented 7th May, 1913.—*Mr. Ross.*
Not printed

61 (13*k*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Roderick McLean, postmaster at Kenlock, Inverness County, Nova Scotia. Presented 8th May, 1913.—*Mr. Chisholm (Inverness)*.....*Not printed*

61 (13*l*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Allan Gillis, postmaster at Gillisdale, South West Margaree, Inverness County, Nova Scotia. Presented 8th May, 1913.—*Mr. Chisholm (Inverness).*
Not printed.

61 (13*m*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of David Shaw, postmaster at Marsh Brook, North East Margaree, Inverness County, Nova Scotia. Presented 8th May, 1913.—*Mr. Chisholm (Inverness).*
Not printed.

61 (13*n*). Return to an Order of the House of the 29th January, 1913, for a copy of all papers concerning the investigation and dismissal of Helen Joubert, postmistress at Sayabec, Quebec. Presented 8th May, 1913.—*Mr. Lemieux*.....*Not printed.*

61 (13*o*). Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence, letters, and telegrams between the Honourable Postmaster General or the Post Office Department, and any person or persons, relative to the dismissal or the request therefor of D. A. Redmond, until recently postmaster at Brinston, Ontario. Presented 8th May, 1913.—*Mr. Graham*.....*Not printed.*

61 (13*p*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Dan. McEachern, postmaster at McEachern's Mills, Broad Cove Chapel, Inverness County, Nova Scotia. Presented 8th May, 1913.—*Mr. Chisholm (Inverness).*
Not printed.

61 (13*q*). Return to an Order of the House of the 3rd February, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Daniel Dunlop, postmaster at New Campbellton, riding of North Cape Breton and Victoria, N.S., and of the evidence taken and reports of the investigation held by H. P. Duchemin, in regard to same, with a detailed statement of expense of such investigation. Presented 8th May, 1913.—*Mr. McKenzie*.....*Not printed.*

61 (13*r*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of Arthur Armstrong, postmaster at Greenfield, Carleton County, N.B. Presented 8th May, 1913.—*Mr. Carvell*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (13*s*). Return to an Order of the House of the 3rd February, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relative to the dismissal of Alex. Matheson, postmaster at Boulardarie Centre, north riding Cape Breton and Victoria. Presented 8th May, 1913.—*Mr. McKenzie*.....*Not printed.*

61 (13*t*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Arthur Talbot, late postmaster at Robertsville, County of Megantic, Province of Quebec. Presented 8th May, 1913.—*Mr. Pacaud*.....*Not printed.*

61 (13*u*). Dismissal of N. C. Lyster, late postmaster at Lloydminster, Sask.—(*Senate*). *Not printed.*

61 (13*v*). Return to an Order of the House of the 2nd April, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of Mrs. Maggie Cameron, postmistress at Achosnach, Inverness County, Nova Scotia. Presented 9th May, 1913.—*Mr. Chisholm (Inverness)*.. .. .. ..*Not printed.*

61 (13*w*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of David Fraser, postmaster at North East Margaree, Inverness County, Nova Scotia. Presented 9th May, 1913.—*Mr. Chisholm (Inverness)*.. .. .. ..*Not printed.*

61 (13*x*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal and retention of W. Stayley Porter, postmaster, Port Maitland, Yarmouth County, N.S., and of the evidence taken and report of investigation held by Charles Lane, in regard to the same; also a detailed statement of expenses of such investigation. Presented 9th May, 1913.—*Mr. Law*.....*Not printed*

61 (13*y*). Return to an Order of the House of the 29th January, 1913, for a copy of all charges, telegrams and other documents relating to the dismissal of Alex. McQueen, postmaster at Kowstoke, Inverness County, Nova Scotia, and of the evidence taken and report of investigation held by H. P. Duchemin, in regard to the same; also a detailed statement of the expenses of such investigation. Presented 9th May, 1913.—*Mr. Chisholm (Inverness)* .. ..*Not printed.*

61 (13*z*). Return to an Order of the House of the 3rd February, 1913, for a return showing the number of employees of the Department of Public Works who have been dismissed in the County of Berthier since the 21st September, 1911, giving the names of the said employees; if an inquiry was held in each case; on whose recommendation, in each case, these dismissals were made; the names of those appointed successors to these persons and on whose recommendation. Presented 12th May, 1913.—*Mr. Beland* *Not printed.*

61 (14*a*). Return to an Order of the House of the 10th February, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents in connection with the dismissal and retention of Jesse L. Morton, postmaster at Lower Argyle, N.S., and of the evidence taken and report of the investigation held by Mr. Lane, in regard to the same, also a detailed statement of the expenses of such investigation. Presented 20th May, 1913.—*Mr. Law*.....*Not printed*

61 (14*b*). Return to an Order of the House of the 10th February, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents in connection with the dismissal of Mrs. M. C. Gaudet, postmistress at West Pubnico, Yarmouth County, N.S., and of the evidence taken and report of the investigation held by Mr. Lane, in regard to same, and also a detailed statement of the expenses of such investigation Presented 20th May, 1913.—*Mr. Law*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

61 (14*c*). Return to an Order of the House of the 28th April, 1913, for a copy of all charges, correspondence, telegrams, and other documents relative to the dismissal of John P. McKinnon, section foreman on the Intercolonial railway at Shubenacadie, in the riding of North Cape Breton and Victoria, N.S. Presented 20th May, 1913.—*Mr McKenzie*.....*Not printed.*

61 (14*d*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of Mary A. Bohan, as postmistress at Bath, Carleton County, N.B. Presented 21st May, 1913.—*Mr. Carvell*.....*Not printed.*

61 (14*e*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of Edward Lafferty, postmaster at Benton, Carleton County, N.B. Presented 21st May, 1913.—*Mr. Carvell*.....*Not printed.*

61 (14*f*). Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, telegrams, evidence and other documents regarding the dismissal of Dennis McGaffigan, postmaster at Florenceville, Carleton County, N.B. Presented 21st May, 1913.—*Mr. Carvell*.....*Not printed.*

61 (14*g*). Return to an Order of the House of the 27th January, 1913, for a copy of all correspondence and documents bearing upon any change made or asked for in the employees of the Department of Marine and Fisheries in the County of Bonaventure between 5th December, 1912, up to date. Presented 27th May, 1913.—*Mr. Marcil (Bonaventure)*.. .. ..*Not printed.*

61 (14*h*). Return to an Order of the House of the 15th January, 1913, for a copy of all charges, correspondence, letters, telegrams and other documents relating to the dismissal of J. A. McKenzie, postmaster at Ashfield, Inverness County, N.S. Presented 2nd June, 1913.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed.*

61 (14*i*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, reports and other papers and documents in the possession of the Post Office Department, or any department of the government, relating to the dismissal of James Bowles, postmaster at Alder River, N.S., and if there was an investigation, the names of all the witnesses examined, a copy of the evidence, and a detailed statement of the expense of such investigation. Presented 2nd June, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (14*j*). Return to an Order of the House of the 21st April, 1913, for a copy of all correspondence, complaints, reports, recommendations, petitions, certificates and other documents relating to the dismissal of Mr. Edmund Lacroix, as postmaster of the Parish of St. Joseph du Lac, County of Two Mountains, and the appointment of Rodrique Larocque, of the same place as postmaster. Presented 2nd June, 1913.—*Mr. Ethier*.....*Not printed*

61 (14*k*). Return to an Order of the House of the 26th May, 1913, for a copy of all papers, letters, documents, reports and inquiry, relating to the lighthouse keeper of the Parish of Repentigny, County of L'Assomption. Presented 3rd June, 1913.—Mr. *Seguin*.....*Not printed.*

61 (14*l*). Return to an Order of the House of the 16th April, 1913, for a copy of all papers, documents, evidence, reports, &c., relating to the dismissal of B. C. Kanock, late shipping master at Lunenburg, N.S. Presented 4th June, 1913.—*Mr. McLean (Halifax)*. *Not printed.*

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61 (14*m*). Return to an Order of the House of the 3rd March, 1913, for a copy of all complaints, accusations, correspondence, petitions and telegrams, respecting the dismissal of Ulric Thibaudeau, agent for pilots at Quebec, and of all documents respecting the appointment of his successor, such as petitions, letters of recommendation, &c., and of the evidence and report made after the inquiry held by the inquiring commissioner; and also a detailed statement of the expenses caused by this inquiry. Presented 4th June, 1913.—*Mr. Delisle*.....*Not printed.*

61 (14*n*). Supplementary return to an Order of the House of the 20th January, 1913, for a return showing the names of all officials of the Marine and Fisheries Department who have been dismissed or removed in the County of Pictou, the reasons of the same, the evidence taken at any investigation held in regard to them, and the reports of said investigations, the names of their successors, and a copy of all letters, charges, complaints and recommendations from any person or persons in regard to the said removals or dismissals, or in regard to the appointment of their successors. Presented 4th June, 1913.—*Mr. Macdonald*.....*Not printed.*

61 (14*o*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Post Office Department, or any department of the government relating to the dismissal of Captain Freeman Myers, postmaster at Cole Harbour, Guysborough County, N.S., and if there was an investigation, the names of all witnesses examined, a copy of the evidence, and a detailed statement of the expenses of such investigation. Presented 4th June, 1913.—*Mr. Sinclair.*

Not printed

61 (14*p*). Return to an Order of the House of the 4th December, 1912, for a return showing all public officers removed by the present government in the district of St. James, Montreal, together with the names and duties of such persons, the reasons of their dismissal, the nature of the complaints brought against them, and a copy of all correspondence relating thereto, and of reports of inquiries in the cases where such have been held. Presented 4th June, 1913.—*Mr. Lapointe (Montreal)*.....*Not printed*

61 (14*q*). Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a return showing all the employees of the Dominion government in the constituency of Edmonton, dismissed between 10th of October, 1911, and 21st of November, 1912, the salary being paid to such employee at the time of his dismissal, together with a copy of all correspondence, recommendations to council, orders in council, and all other papers or documents in any way connected with such dismissals. Presented 4th June, 1913.—*Mr. Oliver*.....*Not printed.*

61 (14*r*). Return to an Order of the House of the 4th December, 1912, for a return showing the names of all officials in the district of Sunbury and Queens, who have been dismissed or removed from office since September, 1911, the reason for such dismissal or removal, the evidence taken at any investigation held in regard to them, the reports upon such investigations, the name of any successor appointed in place of dismissed officials, and a copy of all letters, charges, complaints and recommendations in regard to the said removals or dismissals, or in regard to the appointment of their successors. Presented 4th June, 1913.—*Mr. McLean (Sunbury)*.....*Not printed.*

61 (14*s*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Department of Marine and Fisheries, or any department of the government relating to the dismissal of Levi Munroe, harbour master at

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White Head, N.S., and if there was an investigation, the names of all witnesses examined, a copy of the evidence, and a detailed statement of the expenses of such investigation. Presented 4th June, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (14*t*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Post Office Department, or any department of the government, relating to the dismissal of Stanford Langley, postmaster at Isaac Harbour North, N.S., and if there was an investigation the names of all witnesses examined, a copy of the evidence, and a detailed statement of the expenses of such investigation. Presented 5th June, 1913.—*Mr. Sinclair*.....*Not printed.*

61 (14*u*). Return to an Order of the House of the 24th February, 1913, for a copy of all letters, telegrams, correspondence, charges, evidence, reports, and other documents relating to the dismissal of Hugh R. McAdam as postmaster at Arisaig, N.S., and the appointment of Reverend Daniel L. Macdonald as his successor. Presented 5th June, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

61 (14*v*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Post Office Department, or any department of the government, relating to the proposed dismissal of J. J. McNeil, at Grant's Lake, N.S., and if there was an investigation, the names of the witnesses examined and a detailed statement of the expenses of such investigation. Presented 5th June, 1913.—*Mr. Sinclair*.....*Not printed*

61 (14*w*). Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, evidence, reports and other papers and documents in the possession of the Department of Railways and Canals, or any department of the government, relating to the dismissal of Alex. McInnis, car inspector of the Intercolonial railway at Mulgrave, N.S., and if there was an investigation, the names of all witnesses examined, a copy of the evidence, and a detailed statement of the expenses of such investigation. Presented 6th June, 1913.—*Mr. Sinclair*..*Not printed.*

61 (14*x*). Return to an Order of the House of the 28th April, 1913, for a copy of all charges, correspondence, telegrams, and other documents relative to the dismissal of Archibald McDonald, bridge tender on the Intercolonial railway at Grand Narrows, Iona, riding of North Cape Breton and Victoria, N.S. Presented 6th June, 1913.—*Mr. McKenzie*.....*Not printed.*

61 (14*y*). Names of all officials dismissed in Shelburne and Queens from 1st December, 1896. —(*Senate*).....*Not printed.*

62. Return to an Order of the House of the 4th December, 1912, for a return showing the number of all contracts cancelled in the County of Bonaventure since the 1st of October, 1911; the names of the contractors, the prices paid to them, the reasons for the cancellation in each case; and a copy of any investigations and reports had into the causes of such cancellations, the names of the new contractors and the prices paid to them in each case. Presented 14th January, 1913.—*Mr. Marcil (Bonaventure)*. *Not printed.*

62*a*. Return to an Order of the House of the 5th December, 1912, for a return showing the number of rural mail delivery routes that have been established in Canada since the 1st January, 1912, in each province and county, respectively. Presented 14th January, 1913.—*Mr. Lemieux*.....*Not printed.*

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62*b*. Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence, letters, telegrams, complaints and other documents relating to the cancelling of the contract for conveying His Majesty's mails, entered into on the 1st day of January, 1912, between the Honourable Postmaster General and Mr. J. C. Beeman, of Guthrie, County of Missi-quoi; together with the reason for the cancellation of this contract, the price paid to Mr. Beeman, the name of the present contractor and the price paid to him. Presented by Hon. Mr. Pelletier.—*Mr. Kay*.....*Not printed.*

62*c* Return to an Order of the House of the 11th March, 1912, for a copy of all letters, requests, memorandums, tenders and other documents in the possession of the Post Office Department relating to the calling for tenders and the granting of the contract now in force for the carrying of the mail between Sorel and Ste. Victoire, County of Richelieu. Presented 20th January, 1913.—*Mr. Cardin*.....*Not printed.*

62*d*. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, letters, telegrams, tenders, bonds, agreements, contracts and other documents in the possession of the Post Office Department relating to the letting of the contract for carrying the mails between Heatherton and Guysborough, in the year 1912; and also relating to any temporary agreement entered into prior to the date of letting such contract. Presented 21st January, 1913.—*Mr. Sinclair*.....*Not printed*

62*e*. Return to an Order of the House of the 29th January, 1913, for a copy of all letters and other documents relating to the establishment of a rural mail service between Saltsprings and West River Station, in the County of Pictou, in the year 1912. Presented 17th February, 1913.—*Mr. Macdonald*.....*Not printed.*

62*f*. Return to an Order of the House of the 29th January, 1913, for a copy of all letters, and other documents relating to the establishment of a rural mail delivery service between Merigonish Station, County of Pictou, and Arisaig, in the County of Antigonish, in the year 1912. Presented 17th February, 1913.—*Mr. Macdonald.*
Not printed

62*g*. Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence, letters, telegrams and reports regarding the termination of H. D. Decoste's contract for carrying the mails between Linwood Station and Linwood post office and the making of a new contract with D. Delorey, from the 1st January, 1913. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

62*h*. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, complaints, recommendations, telegrams and reports bearing on the railway mail service in Bonaventure County from October, 1911, up to date, and on the appointment and dismissal of officers in such connection, with the names, residences, salaries and duties, as well as of all documents bearing on the suspension of the railway mail service during the period mentioned, as well as a copy of all documents referring to agreements made to meet such a contingency during the coming winter. Presented 25th March, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

62*i*. Return to an Order of the House of the 9th December, 1912, for a copy of all tenders received and the contracts entered into for the carrying of the mails between St. Andrew and Beauley, County of Antigonish, and of all letters, telegrams and correspondence on file in the Post Office Department containing any recommendation or advice regarding the awarding of such contract, or in any way referring thereto. Presented 26th March, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

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62*j*. Return to an Order of the House of the 3rd February, 1913, for a return showing what changes, if any, have been made in the contracts for the carrying of the mails in the County of Berthier, since the 21st September, 1911; in what parishes, on what date, and for what reason; to whom have the new contracts been granted, and if a tender was asked for in each case. Presented 14th April, 1913.—*Mr. Béland.*
Not printed

62*k*. Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, bonds, reports and other papers and documents in the possession of the Post Office Department, or any department of the government, relating to the letting of the mail contract between Guysborough and Charlos Cove, County of Guysborough, N.S., during the year 1912. Presented 28th April, 1913.—*Mr. Sinclair.*
Not printed.

62*l*. Return to an Order of the House of the 14th April, 1913, showing the names of the various railway mail clerks employed, respectively, on the Montreal and Quebec divisions and the date of the appointment and residence of each. Presented 7th May, 1913.—*Mr. Bureau* .....*Not printed.*

62*m*. Return to an Order of the House of the 9th April, 1913, for a copy of the contract entered into by the Post Office Department with the Ontario Equipment Company of Ottawa relating to the purchase of locks for mail bags. Presented 7th May, 1913.—*Mr. Carvell* ....*Not printed.*

62*n*. Return to an Order of the House of the 7th April, 1913, for a copy of all correspondence, telegrams, &c., exchanged between the Honourable the Postmaster General and Dr. Faucher, of Quebec, concerning the purchase of a certain patented lock for mail bags. Presented 7th May, 1913.—*Mr. Lapointe (Kamouraska)*.. .. .. ..*Not printed.*

62*o*. Return to an Order of the House of the 7th April, 1913, for a copy of all correspondence, telegrams, &c., exchanged between the Honourable the Postmaster General and Mr. Aimé Dion, advocate of Quebec, concerning the purchase of a certain patented lock for mail bags. Presented 7th May, 1913.—*Mr. Verville*.....*Not printed.*

62*p*. Return to an Order of the House of the 29th January, 1913, for a copy of all letters, petitions, telegrams, complaints, reports, bonds of indemnity, and all other papers and documents in the possession of the Post Office Department, or any department of the government, relating to the contract for carrying the mails between Linwood or some point of the Intercolonial railway, County of Antigonish, N.S., and Grosvenor, County of Guysborough, N.S. Presented 9th May, 1913.—*Mr. Sinclair*....*Not printed.*

62*q*. Return to an Order of the House of the 24th April, 1913, for a return showing the full names of the mail carriers in the County of Vaudreuil and Soulanges; between what place they perform the service; the distance between each of these places; the amount of each carrier's contract, and the amount the government paid for the carriage of the mail in these different places before September, 1911. Presented 16th May, 1913.—*Mr. Boyer*.....*Not printed.*

62*r*. Return to an Order of the House of the 7th May, 1913, for a return showing the number of post offices in Yarmouth County, Nova Scotia, not served with daily mail, giving the names and the number of times per week served. Presented 20th May, 1913. —*Mr. Law*..... ..... *Not printed.*

62*s*. Return to an Address to His Excellency the Administrator of the 7th April, 1913, for a copy of all orders in council, reports of experts and contracts, in connection with

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the different purchases of rural mail delivery boxes made by the Post Office Department since 1908, until 1st January, 1912. Presented 21st May, 1913.—*Mr. Lemieux.* *Not printed.*

62*t*. Return to an Order of the House of the 12th May, 1913, for a return giving the names of the post offices and of the postmasters in the Counties of Soulanges and Vaudreuil. Presented 21st May, 1913.—*Mr. Boyer*.....*Not printed.*

62*u*. Return to an Order of the House of the 5th December, 1912, for a copy of all letters, telegrams, petitions and other documents relating to the establishment of rural mail delivery routes in the County of Pictou since the 1st October, 1911, with a statement of all routes applied for, of routes established and of those refused, and the reason for their refusal. Presented 2nd June, 1913.—*Mr. Macdonald*.....*Not printed.*

62*v*. Return to an Order of the House of the 31st March, 1913, for a copy of all correspondence concerning the purchase of new locks for mail bags by the Post Office Department from the Ontario Equipment Company. Presented 4th June, 1913.—*Mr. Carvell.* *Not printed.*

62*w*. Return to an Order of the House of the 17th February, 1913, for a copy of all correspondence, letters, telegrams, memoranda, tenders, bonds and all other documents relative to the contract for the carrying of the mail between the post office and Canadian Pacific Railway station at Three Rivers and vice versa, since the eleventh day of October, 1911, to date. Presented 4th June, 1913.—*Mr. Tobin*.....*Not printed.*

62*x*. Return to an Order of the House of the 21st April, 1913, for a copy of all correspondence, telegrams, complaints, affidavits, reports, recommendations, requests, certificates, contracts and other documents relating to the cancelled contract of M. E. Bougie, for carrying the mails between the post office and railway station at Bromptonville, Quebec. Presented 4th June, 1913.—*Mr. Bureau*.....*Not printed.*

63. Return to an Order of the House of the 4th December, 1912, for a return showing all the new post offices opened in the County of Bonaventure, since October, 1911, up to date, and a copy of the correspondence in connection therewith, together with the names of such post offices and postmasters, and the location of such offices; and also a copy of all papers asking for such offices. Presented 14th January, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

64. Return to an Order of the House of the 9th December, 1912, for a copy of all petitions, correspondence, memoranda, recommendations and other papers or documents in the possession of the Department of Marine and Fisheries relating to the proposals to supply medicine or medical attendance free, or otherwise, to Canadian boat fishermen. Presented 14th January, 1913.—*Mr. Sinclair*.....*Not printed*

65. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, petitions, complaints, memoranda, reports and investigations regarding the service performed by the steamer *Canada*, owned by the Inter-Provincial Navigation Company of Fraserville, Quebec, since October, 1911, up to date, and also of all documents bearing on the present contract with the Department of Trade and Commerce, or the renewal or extension thereof. Presented 14th January, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed*

66. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, telegrams, letters, &c., relating to the matter of the establishment of a lobster hatchery at Spry Bay, Halifax County, N.S. Presented 14th January, 1913. —*Mr. Maclean (Halifax)*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

67. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, telegrams, &c., between the Department of Trade and Commerce and any company, person or persons, relative to the continuance and payment of a subsidy towards a steamship service between St. John, N.B., and Bear River, N.S., for the fiscal year 1912, and performed during the fiscal year 1911. Presented 17th January 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

67*a*. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, documents, memoranda, letters, telegrams and documents bearing on a request for a subsidy for a steam service between Bonaventure, Quebec, or any other part of Bonaventure County and Bathurst, New Brunswick, or any other part of Gloucester County, New Brunswick, and between New Richmond, Quebec, and Dalhousie, New Brunswick, and between Carleton and Miguasha, Quebec, and Dalhousie, New Brunswick, or Campbellton, New Brunswick, or both, as well as a copy of all replies made for such subsidies and this since October, 1911, to date. Presented 14th January, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

67*b*. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all advertisements, tenders, contracts, orders in council memoranda, papers, letters and correspondence in any way relating to a subsidized steamship service between Canadian ports and any ports of the British West Indies, or any proposed improvement or extension of such steamship service since 1st November, 1911 to the present time. Presented 15th January, 1913.....*Not printed.*

67*c*. Return to an Order of the House of the 4th December, 1912, for a copy of all reports made by officials of the Department of Railways and Canals on the Quebec and Oriental railway, and the Atlantic, Quebec and Western railways, together with a statement of the subsidies paid such railways since October, 1911, up to date, and a copy of all correspondence in that connection. Presented 17th January, 1913.—*Mr Marcil (Bonaventure)*.....*Not printed*

67*d*. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence between the Minister of Railways or any other member of the government and any person regarding the acquisition by the government of Canada of the Quebec Oriental railway, formerly the Atlantic and Lake Superior railway, and the Atlantic, Quebec and Western railway, or both. Presented 27th January, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

67*e*. Return to an Order of the House of the 29th January, 1913, for a copy of the report made to the Minister of Railways and Canals by the party of government engineers who inspected the Quebec and Saguenay railway during December, 1912, January, 1913. Presented 27th February, 1913.—*Mr. Lemieux*.....*Not printed.*

67*f*. Return to an Order of the House of the 17th February, 1913, for a copy of all reports made by any engineers or accountants to the Minister of Railways and Canals on the usefulness of the Atlantic, Quebec and Western railway and the Quebec Oriental railway, to the Intercolonial railway as branch lines or feeders. Presented 27th February, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

67*g*. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all papers, documents, petitions, orders in Council, memoranda, correspondence, &c., by and between the government of Canada or any member thereof, and the government of the province of British Columbia, or any member thereof, since 1st May, 1912, relating to the subject to an increase of the provincial subsidy to the said province. Presented 16th April, 1913.—*Mr. Maclean (Halifax)*.

Printed for sessional papers.

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67*h*. Return to an Address to His Royal Highness the Governor General of the 20th January, 1913, for a copy of all documents and memorials of the government of British Columbia presenting claims for additional provincial subsidies, and of all correspondence and orders in council on the same. Presented 16th April, 1913.—*Sir Wilfrid Laurier*.....*Printed for sessional papers.*

67*i*. Copy of agreement made with the several provinces as to the expenditure of the subsidies granted under the Agricultural Aid Act, and statement showing the purposes for which said subsidies are to be expended. Presented 6th June, 1913, by Hon. Mr Burrell.....*Not printed.*

68. Copies of general orders promulgated to the militia for the period between 2nd November, 1911, and 5th Novmber, 1911. Presented by Hon. Mr. Hughes, 14th January, 1913. *Not printed.*

69. Return to an Address to His Excellency the Right Honourable Sir Charles Fitzpatrick, P.C., &c., administrator, of the 31st March, 1913, for a copy of all papers, documents, petitions, letters, telegrams, orders in council and other papers and documents in possession of the Department of Customs, relating to the duty payable on twine used for fishing purposes, and especially relating to the construction placed upon item 682 of the Customs Tariff. Presented 23rd May, 1913.—*Mr. Sinclair*.....*Not printed.*

70. Return to an Order of the House of the 30th November, 1912, for a return showing:—

1. The date when the present Canadian Pure Food Act, now known as the Adulteration Act, R.S.C., was enacted.

2. What foods, beverages or drugs have standards of strength and purity under the Act been fixed, and what are the dates when such standards become operative.

3. What foods, beverages or drugs have standards of strength and purity been prepared and recommended from time to time by the chief analyst, which have not been put in force, and why were such standards not put in force.

4. How many cases of adulteration together with cases which show standards of quality below those required by the Adulteration Act, have been ascertained by the Dominion analyst since the said Act came into operation.

5. In how many of such cases did prosecutions under the Act or under the Criminal Code follow, and in how many cases were convictions secured. Presented 14th January, 1913.—*Mr. McDonnell*.....*Not printed.*

71. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, negotiations, proposals in writing and other papers and documents in the possession of the government, or any department thereof, relating to reciprocity in trade with the United States, bearing date between the 1st day of January, 1890, and the 31st day of December, 1891. Presented 14th January, 1913.—*Mr. Sinclair.* *Not printed*

72. Return to an Order of the House of the 4th December, 1912, for a copy of all letters, telegrams, &c., exchanged between the member for Bellechasse County and the Minister of Agriculture and the Postmaster General, concerning the appointment of an additional physician at the quarantine station of Grosse Ile. Presented 14th January, 1913.—*Mr. Lemieux*.....*Not printed.*

72*a*. Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, documents, recommendations and reports concerning the appointment of Doctor Pomminville, to the position of surgeon of the St. Vincent de Paul penitentiary, replacing Doctor A. Allaire. Presented 24th January, 1913.—*Mr. Wilson (Laval)*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

72b. Return to an Order of the House of the 10th December, 1912, for a copy of all letters, telegrams, correspondence and other documents relating to the appointment of Charles W. Hatfield, fishery officer on the Tusket River, Yarmouth County, N.S. Presented 27th January, 1913.—*Mr. Law*.....*Not printed.*

Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, letters, requests, telegrams and other documents relating to the appointment of Louis Nadeau as postmaster at Ste. Christine, County of Bagot. Presented 4th February, 1913.—*Mr. Marcil*.....*Not printed.*

72d. Return to an Order of the House of the 29th January, 1913, for a copy of all orders letters, telegrams and other documents in connection with the appointment of Lt.-Col. Warburton, as administrative medical officer at the Charlottetown camp in 1912, and of all letters and telegrams asking for a change in the said appointment, and of all orders and other documents relating to his being superseded, and to the appointment of his junior, Lt.-Col. Jenkins, in his place. Presented 13th February, 1913.—*Mr. Macdonald*.....*Not printed.*

72e. Return to an Order of the House of the 27th January, 1913, for a copy of all documents, letters, correspondence, recommendations, reports, &c., relating to the appointment of Mr. J. Begin as manager of the experimental farm at Ste. Anne de la Pocatière. Presented 13th February, 1913.—*Mr. Lapointe (Kamouraska)*....*Not printed.*

72f. Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence exchanged between Dr. Marcotte, M. Lavallée, M.P., the Honourable the Postmaster General and the Minister of Agriculture, concerning the appointment of an additional medical officer at Grosse Isle quarantine station. Presented 19th February, 1913.—*Mr. Lemieux*.....*Not printed.*

72g. Return to an Order of the House of the 3rd March, 1913, for a copy of all letters, telegrams, recommendations and other papers in connection with the appointment of John Macdonald as Inspector of Inland Revenue for the Maritime Provinces, and of all letters, telegrams, applications, recommendations and other papers received from any other person or persons relative to the applications of other persons for the position. Presented 17th March, 1913.—*Mr. Macdonald*.....*Not printed.*

72h. Return to an Order of the House of the 17th February, 1913, for a copy of all letters, petitions, telegrams, recommendations and other papers and documents, in the possession of the Department of Marine and Fisheries, or any department of the government, relating to the appointment of F. W. Kelley, M.D., as port physician at Bridgewater, N.S. Presented 18th March, 1913.—*Mr. Law*.....*Not printed*

72i. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a return showing all appointments to office under the Dominion government in the constituency of Edmonton from 10th October, 1911, to 21st November, 1912, with a statement of the salaries in each case, together with a copy of all correspondence, recommendation to council, orders in council, and all other papers or documents in any way connected with such appointments. Presented 28th March, 1913.—*Mr. Oliver*.....*Not printed.*

72j. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, recommendations, reports, memoranda and other documents bearing on the appointment of a general foreman, or other permanent or temporary officials, of the Department of Public Works in the County of Bonaventure since October, 1911, up to date, with the names, residences, duties and salaries of such appointees. Presented 2nd May, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

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72*k*. Appointment of Mr. McCloskie as postmaster at Waukau, British Columbia.—(*Senate*) *Not printed.*

73. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a return showing all changes made in the Customs Tariff of Canada by order in council since the close of last session of parliament. Presented 14th January, 1913.....*Not printed*

74. Return to an Order of the House of the 9th December, 1912, for a return showing the quantity and value of molasses of cane, as defined in tariff item No. 137a, imported into Canada for the fiscal year ending 31st March, 1912, from each island of the British West Indies, which are parties to the Canada-West India Trade Agreement. Presented 14th January, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

75. Letter of the Honourable F. D. Monk, M.P., to the Right Honourable the Prime Minister, resigning his position as Minister of Public Works, and the letter of the Prime Minister in acknowledgment thereof. Presented by Hon. Mr. Borden, 14th January, 1913.....*Not printed.*

75*a*. Return to an Order of the House of the 26th May, 1913, for a copy of all letters, reports, documents and all other communications relating to the appointment of Colonel Crowe as Commandant of the Royal Military College and to his resignation of said position, or to the extension of his term of service or to the termination thereof, and of all papers or letters passing between the minister and Colonel Crowe, relative to his resignation or the failure to extend his term of service. Presented 3rd June, 1913.—*Mr. Macdonald*.....*Not printed*

75*b*. Return to an Order of the House of the 26th May, 1913, for a copy of all letters, reports, complaints and other communications and documents which passed between General McKenzie and the Minister of Militia or his department, previous to, and which led up to the resignation of General McKenzie; and also a copy of said resignation, and the reply of the minister thereto, and of any and all communications had with the War Office thereto, and of all other papers and documents in connection therewith. Presented 4th June, 1913.—*Mr. Macdonald*.....*Not printed.*

76. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, letters, telegrams, complaints and reports, bearing on the delay in the payment of census enumerators in the County of Bonaventure, in connection with the last census, together with the names, residences, amounts, and dates of payment. Presented 15th January, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

77. Report of departmental commission on the official statistics of Canada. Presented 15th January, 1913 .....*Printed for distribution only.*

78. Return to an Order of the House of the 18th March, 1912, for a copy of all correspondence in the possession of the Postmaster General respecting the change of name of Broderick post office in the Province of Saskatchewan, to St. Aldwyn. Presented 15th January, 1913.....*Not printed.*

78*a*. Return to an Order of the House of the 30th November, 1911, for a copy of all papers, telegrams, letters, &c., between the Postmaster General and any other person respecting the closing or removal of the present post office at Spry Bay, Halifax County. Presented 20th January, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

79. Report of the commissioner Dominion Police Force, for the year 1912. Presented by Hon. Mr. Foster, 15th January, 1913.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

80. Return to an Order of the House of the 9th December, 1912, for a copy of all correspondence, complaints, reports and all documents relating to the cancelling of lease No. 18778, consented to by the Honourable Minister of Railways and Canals, to Aurile Lebœuf, on the 12th December, 1910.—Presented 16th January, 1913.—*Mr. Papineau.*
Not printed

81. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of all orders in council passed since 1st October, A.D. 1911, relating to the Board of Management of the Government Railways of Canada, or of any other member thereof, or in any way affecting the same, or any official of the Intercolonial Railway, as regards the duties to be performed or the powers to be exercised by the said Board or any member thereof, or by any such official, together with a copy of all recommendations, letters, applications, instructions, or other correspondence, in any manner relating thereto or having regard to the said orders in council as to the management of the Intercolonial railway. Presented 17th January, 1913.—*Mr. Emmerson*.....*Not printed*

81*a*. Return to an Address to His Royal Highness the Governor General of the 4th December, 1912, for a copy of a certain Order in Council issued during the current year by which certain official reports formerly made to Board of Management of the Intercolonial Railway have been ordered in future to be made to Mr. F. P. Brady. Presented 17th January, 1913.—*Mr. Sinclair*.....*Not printed.*

82. Return to an Order of the House of the 5th December, 1912, for a copy of all papers, including surveys, tenders, and every other record, or document in the possession of the Department of Railways and Canals or any other department of the government relating to the building of a line of railway from Estmere, County of Victoria, Province of Nova Scotia, to the town of Baddeck in the same county. Presented 17th January, 1913.—*Mr. McKenzie*.....*Not printed.*

83. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all documents, papers, tenders, contracts, orders in council and correspondence in connection with the supply of castings for and the purchase of scrap iron from the eastern division of the Intercolonial Railway since 1st May, 1912. Presented 17th January, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

83*a*. Return to an Order of the House of the 9th December, 1912, for a return showing the names of the employees on the dining cars of the Intercolonial Railway and the nature of their employment; and also of the employees on the Pullman cars of the Intercolonial Railway and the nature of their employment. Presented 17th January, 1913.—*Mr. Boulay*.....*Not printed.*

83*b*. Return to an Order of the House of the 9th December, 1912, for a copy of all papers documents, telegrams, letters, &c., relating to a strike of temporary employees of the Intercolonial Railway at Halifax, in August, 1912. Presented 27th January, 1913.—*Mr. Mclean (Halifax)*.....*Not printed.*

83*c*. Return to an Order of the House of the 10th December, 1912, for a copy of all evidence plans, reports, correspondence, &c., respecting an inquiry held concerning an accident on the Intercolonial Railway at St. André de Kamouraska on 7th October, 1912, caused by train No. 33, the maritime express going west. Presented 27th January, 1913.—*Mr. Lapointe (Kamouraska)*.....*Not printed.*

83*d*. Return to an Order of the House, of the 29th January, 1913, for a copy of the evidence taken at the inquiry held in the month of November, 1912, by Mr. MacDonald

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superintendent of the Intercolonial at Lévis, in reference to Alfred Laugnay, an employee of the Intercolonial at St. Charles, County of Bellechasse. Presented 27th February, 1913.—*Mr. Lapointe (Kamouraska)*.....*Not printed.*

83*e*. Return to an Order of the House of the 19th February, 1913, for a copy of all telegrams, letters, petitions, reports of engineers, plans, surveys, and other documents in the possession of the Department of Railways and Canals, and having been received since 1st January, 1912, relating to the construction of a branch line of the Intercolonial Railway into Guysborough County. Presented 18th March, 1913.—*Mr. Sinclair*.....*Not printed.*

83*f*. Return to an Order of the House of the 24th February, 1913, for a copy of all petitions, resolutions, letters, telegrams and correspondence, relating to free or reduced transportation of hay over the Intercolonial Railway for the farmers of Antigonish County, Nova Scotia, and also of the evidence taken and report made as to the shortage of hay in that and other of the eastern counties of Nova Scotia. Presented 18th March, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

83*g*. Return to an Order of the House of the 29th January, 1913, for a copy of all letters telegrams, tenders, acceptances of tenders, cancellation of tenders and other papers and documents in the possession of the Department of Railways and Canals, or any department of the government, bearing date after 1st July, 1912, relating to the supply of ice for the use of the Intercolonial Railway at Mulgrave, N.S. Presented 18th March, 1913.—*Mr. Sinclair*.....*Not printed.*

83*h*. Return to an Order of the House of the 12th February, 1913, for a copy of all letters correspondence, petitions and other documents, on file in the Department of Railways and Canals, or in the office of the Intercolonial Railway at Moncton, relating or in any way appertaining to the new public wharf at Sackville, N.B., and the necessity of establishing in the interest of the traffic of the Intercolonial Railway, and of the shipping and trade facilities of Sackville, and of the commerce of communities adjacent thereto, rail connections between the said wharf and the main line of the said railways at Sackville station; also of all letters and other communications received by the chairman or vice-chairman of the Government Railways Managing Board, or by any official of the said railway, relating in any manner to the said subject, received by them or any of them during the years 1911, 1912 and 1913. Presented 19th March, 1913.—*Mr. Emmerson*.....*Not printed*

83*i*. Return to Order of the House of the 19th March, 1913, for a return showing who the tenderers were, and the amount of each tender for the supply of castings for the Intercolonial Railway during the present year. Presented 28th March, 1913.—*Mr. Macdonald*.....*Not printed.*

83*j*. Return to an Order of the House of the 19th March, 1913, for a return showing how many kegs of nails were purchased in 1912 for the Intercolonial Railway; the prices paid therefor in each case; whether tenders were invited in the case of each purchase and, if so, who the respective tenderers were and the prices submitted; to whom were the contracts awarded in each case. Presented 28th March, 1913.—*Mr. Murphy.*
Not printed.

83*k*. Return to an Order of the House of the 19th March, 1913, for a return showing the amounts received by the Intercolonial Railway for freight and passengers respectively for each of the twelve months of the calendar years 1910, 1911 and 1912, at the following stations:—Montreal, Halifax, St. John, Sydney, Truro, Moncton, New Glasgow

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and Amherst; also, the total receipts of the said railway for freight and passengers respectively during each of the said years. Presented 28th March, 1913.—*Mr. Rhodes.* *Not printed.*

83*l*. Return to an Order of the House of the 20th January, 1913, for a copy of all letters, correspondence, telegrams, representations, requests and reports on file in the Department of Railways and Canals, or in the offices of the Intercolonial Railway at Moncton, or among the records of the Government Railways Managing Board, or in the office of the assistant chairman of the Government Railways Managing Board, relating to or in any way connected with the water supply system at Dorchester station on the Intercolonial railway, or relating to the absence of and the total failure to provide a supply of water for drinking or other purposes at that station, or in connection with the dwelling of the station agent in the Station House; and also of all correspondence, letters, requests, recommendations and reports relating to the alleged necessity of additional clerical or other help or assistance at the station. Presented 21st April, 1913.—*Mr. Emmerson*.....*Not printed.*

83*m*. Return to an Order of the House of the 12th February, 1913, for a copy of all correspondence, letters, telegrams, reports and other papers on file in the Department of Railways and Canals, or in the offices of the Intercolonial Railway at Moncton, relating to M. L. Tracy, an employee of the mechanical department of the Intercolonial during the years 1899 and 1900, and of all letters and correspondence relating to the case of the said M. L. Tracy, passing between the then Minister of Railways and Canals and any of the officials of the railway, during those years; also a copy of the letters of D. Pottinger, then general manager, the late James E. Price, then general superintendent, and the late M. Jarvis, then a divisional superintendent of said railway, relating to the same subject during the said period of 1899 and 1900. Presented 21st April, 1913.—*Mr. Emmerson*.....*Not printed.*

83*n*. Return to an Order of the House of the 3rd March, 1913, for a statement of all amounts collected by the Intercolonial Railway for freight on hay carried from Amherst and other stations on the Intercolonial, County of Cumberland, to Antigonish, N.S., and consigned to C. Edgar Whidden or C. B. Whidden & Son, in the month of January last and February instant, and by whom such freight was paid; also a copy of all way bills and bills of lading for the same. Presented 21st April, 1913. —*Mr. Chisholm (Antigonish)*.....*Not printed.*

83*o*. Return to an Order of the House of the 3rd February, 1913, for a copy of all letters, petitions, telegrams, complaints, communications, reports and other papers and documents, received since the 1st day of October, 1911, by and now in the possession of the Department of Railways and Canals, the Government Railway Managing Board or any official of the Intercolonial Railway or of the Prince Edward Island railway, relating to or in any manner appertaining to an application for, or a proposed reduction of the working hours for the Intercolonial railway employees at Moncton, or at any other point of the Intercolonial railway or the Prince Edward Island railway. Presented 21st April, 1913.—*Mr. Emmerson*.....*Not printed.*

83*p*. Return to an Order of the House of the 24th February, 1913, for a copy of all complaints, requirements, requisitions, petitions, and correspondence of all kinds made by the Sydney, N.S., Board of Trade, or by the citizens of the city of Sydney, or any of them, having reference to better and increased facilities on the Intercolonial Railway on the Sydney division. Presented 21st April, 1913.—*Mr. Carroll.* *Not printed.*

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83*q*. Return to an Order of the House of the 31st March, 1913, for a copy of all letters, papers and other documents relating to the claim for damages for the death of the young son of Thomas Hoare, who was killed at a crossing of the Intercolonial Railway in the town of Stellarton in the summer of 1912, and of all petitions, letters, and other papers asking for the placing of gates or other protection at said crossing. Presented 1st April, 1913.—*Mr. Macdonald*.....*Not printed.*

83*r*. Return to an Order of the House of the 14th April, 1913, for a copy of all correspondence exchanged between the Department of Railways and Canals at Moncton and the same department at Campbellton, on the subject of the collision which occurred at St. Moise, during the month of February, 1913, between the trains of E. Smith and the regular train No. 99, omitting from it the inquiry held in the matter. Presented 29th April, 1913.—*Mr. Boulay*.....*Not printed.*

83*s*. Return to an Order of the House of the 7th April, 1913, for a return showing the names, residences and occupations of all the employees of the Intercolonial Railway who have been dismissed in the County of Rimouski since the 21st September, 1911. Presented 29th April, 1913.—*Mr. Lapointe (Kamouraska)*.....*Not printed.*

83*t*. Certified copy of a report of the Privy Council of the 5th May, 1913, covering the appointment of Frederick Passmore Gutelius, as general manager of Government Railways. Presented by Hon. Mr. Cochrane, 7th May, 1913... .. .. ..*Not printed.*

83*u*. Return to an Order of the House of the 31st March, 1913, for a copy of all letters, memorials, petitions, correspondence, reports and other documents in the Department of the Postmaster General, or on file therein, relating or in any wise appertaining to the inauguration or establishing of railway mail facilities between Moncton, N.B., westward over the Intercolonial Railway towards St. John, in the morning, so as to furnish, among other things, opportunities for the transmission of newspapers and other mail matter, along said railway, to make morning connection with the railway mail facilities afforded by the railway from Salisbury, Westmorland County, N.B., running into Albert County, N.B.; and also relating to the establishment of railway mail facilities on each week day evening between Moncton eastward over the said railway by train known as number 84, running between Moncton, N.B., and Springhill Junction, Nova Scotia, thus affording the direct mail connection for newspapers and other mail matter each evening from Moncton to Shediac, Memramcook, Dorchester, Sackville, Amherst, and intermediate points east of Moncton; together with a statement showing what, if any, such railway mail facilities, either by locked bag or otherwise, were established or furnished over either of the said routes, and stating the respective dates when the same were so established or furnished generally, or in relation to any one of the newspapers published in Moncton, either in the morning or in the evening. Presented 12th May, 1913.—*Mr. Emmerson*.....*Not printed.*

83*v*. Return showing whether any contract has been made for the construction or supply of cars of any kind to the Intercolonial Railway since 1st January, 1913, and if so, to whom the contract was awarded; the number of cars, kind or class, and the price to be paid; whether any tenders were called for previous to awarding said contract, and if so, who the tenderers were, the amount of the tender in each case, and if tenders were calld for by private request or public advertisement. Presented 21st May, 1913. —*Mr. Macdonald*..... .....*Not printed.*

83*w*. Return to an Order of the House of the 28th April, 1913, for a return showing all amounts collected by the Intercolonial Railway for freight on hay shipped from Amherst and other stations on the Intercolonial, in the County of Cumberland, to Antigonish and other stations in the County of Antigonish, during the months of

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January, February and March last; the name of the consigners and of the consignees, the amount of freight paid on each shipment and by whom paid; also a copy of all way-bills and bills of lading for same. Presented 6th June, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

84. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all papers, documents, memoranda, orders in council, letters and correspondence, relating in any way to the closing of the Canadian Immigration Office at Boston, U.S.A., in 1911, and its subsequent re-establishment. Presented 17th January, 1913.—*Mr. McLean (Halifax)*.....*Not printed*

85. Copies of despatches dated 11th December, 1912, which have been addressed to the Governors General of the Commonwealth of Australia and the Union of South Africa and the Governors of New Zealand and Newfoundland, on the subject of representation of the self-governing Dominions on the Committee of Imperial Defence. Presented by Hon. Mr. Borden, 17th January, 1913.....*Not printed.*

86. Reports in connection with the Tides and Currents of Northumberland Strait.—(*Senate*).....*Not printed.*

87. Archives Branch, *re* transferring of from Department of Agriculture to Secretary of State.—(*Senate*).....*Not printed.*

88. Commission appointed to investigate Indian reserves of British Columbia.—(*Senate*). *Not printed.*

89. Insurance rates between Canadian Atlantic ports, and ports in the United Kingdom.—(*Senate*) .....*Printed for distribution and sessional papers.*

90. Report of departmental commission relating to official statistics of Canada.—(*Senate*). *Printe d for distribution only.*

91. Copy of the Sixth Joint Report of the Commissioners for the Demarcation of the Meridian of the 141st degree of west longitude. Presented by Hon. Mr. Roche, 21st January, 1913.....*Not printed.*

92. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, petitions, memoranda, correspondence, &c., with the Government of British Columbia or any member thereof, with the fishery officers of the Marine and Fisheries Department resident in said province, with salmon canneries in said province, and with any company, person or persons, relating to the prohibition of the export of sockeye salmon from the said province of British Columbia since 15th October, 1911. Presented 20th January, 1913.—*Mr. Maclean (Halifax)*....*Not printed.*

93. Return to an Order of the House of the 20th March, 1912, for a copy of all correspondence and memoranda on the subject of cable rates, exchanged between the Canadian Post Office Department and the British Post Office Department. Presented 20th January, 1913.—*Mr. Lemieux*.....*Not printed.*

94. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all papers, documents, letters, &c., between the Government of Canada and the Commonwealth of Australia for the past twelve months relative to the matter of preferential tariff arrangements between the said two countries. Presented 21st January, 1913.—*Mr. Maclean (Halifax)*..*Printed for sessional papers only.*

95. Report of Mr. Olivar Asselin on an investigation of Belgian and French emigration to Canada. Presented by Hon. Mr. Roche, 21st January, 1913.
Printed for distribution and sessional papers.

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95*a*. Return to an Order of the House of the 4th December, 1912, for a copy of all com plaints, letters, papers, reports, and of all documents bearing on the investigation held at Port Daniel West, Quebec, into the conduct of Edward Dea, as overseer or guardian of the lobster hatchery at that place. Presented 22nd January, 1913.—*Mr. Marcil* .....*Not printed.*

95*b*. Report of R. A. Pringle, Esq., K.C., in relation to the investigation of the wreck of the steamer *Mayflower*, on the 12th November, 1912. Presented by Hon. Mr. Hazen, 6th February, 1913.....*Not printed.*

95*c*. Return to an Address to His Royal Highness the Governor General of the 29th January, 1913, for a copy of the report of the commission appointed to investigate complaints against the United Shoe Machinery Company, together with the order in council appointing the commission, the complaints upon which the order was issued and all action, if any, taken by the government on report of commission, by order in council or otherwise. Presented 11th February, 1913.—*Sir Wilfrid Laurier.*
Not printed

95*d*. Return to an Order of the House of the 20th January, 1913, for a copy of all evidence, letters, telegrams and other documents in connection with the investigation into the stranding of the D. G. steamer *Earl Grey* at Toney River, County of Pictou, in the spring of 1912; of the reports of the commissioner investigating the same, and of all correspondence, telegrams and documents in connection therewith, and of any departmental action in connection therewith. Presented 18th March, 1913.—*Mr. Macdonald.*
Not printed

95*e*. Return to an Order of the House of the 27th January, 1913, for a copy of all letters, papers, evidence and other documents in connection with the investigation into the collision between the steamship *City of Sydney* and the tug boat *Douglas H. Thomas*, in Sydney Harbour, 13th November, 1912, and of the findings and reports of the commissioner holding the investigation in regard to the same. Presented 2nd April, 1913.—*Mr. Macdonald*.....*Not printed.*

96. Report of the Second International Moral Education Congress held at the Hague, 22nd to 27th of August, 1912, and as related thereto, on moral instruction in the Canadian public schools, &c., by Mr. J. A. M. Aikins, who was appointed by the government to represent Canada at that Congress. Presented by Hon. Mr. Borden, 21st January, 1913.....*Printed for distribution only.*

97. Return to an Order of the House of the 4th December, 1912, for a copy of all pay-lists, letters, documents, letters and other papers in connection with the expenditures at Cariboo Island in the County of Pictou. Presented 21st January, 1913.—*Mr Macdonald* .....*Not printed.*

98. Return to an Order of the House of the 22nd January, 1913, for a copy of all correspondence, letters and telegrams between the Minister of Marine and Fisheries, or any officer of his department, and J. A. Gillies, K.C., Sydney, relating to the purchase from John B. Nicholson, of a site for a salmon hatchery at Snidlope Lake, Richmond County, N.S., and also of all accounts, charges and vouchers received from the said J. A. Gillies, for services in connection therewith and the payments made to the said J. A. Gillies in respect of the same. Presented 7th February, 1913.—*Mr. Kyte.*
Not printed

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99. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents and correspondence, between the Department of Public Works and any person or persons relating to the placing of obstructions in the waters of South West Cove, Lunenburg County, N.S. Presented 24th January, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

100. Return to an Order of the House of the 4th December, 1912, for a copy of all pay-lists, letters, documents, telegrams and other papers in connection with the expenditures at Skinner's Cove in the County of Pictou. Presented 24th January, 1913.—*Mr. Macdonald*.....*Not printed.*

101. Return to an Address to His Royal Highness the Governor General of the 22nd January, 1912, for a copy of all correspondence between the government of Canada and the government of the Province of Ontario, with regard to the extension of the boundaries of the said province. Presented 28th January, 1913.—*Sir Wilfrid Laurier.* *Not printed.*

102. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, reports, and documents, bearing on the claim of C. R. Scoles, of New Carlisle, Quebec, to a balance of subsidy voted to the Atlantic and Lake Superior railway, since October, 1911, to date. Presented 24th January, 1913.—*Mr. Marcil.* *Not printed.*

103. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, letters, telegrams, reports and other documents concerning an alleged defalcation in the accounts of Joseph J. Melanson, clerk in the customs office at Bathurst, County of Gloucester, which caused an inquiry to be held on the 23rd of October last by the Provincial Inspector of Customs, with the name of the accuser. Presented 24th January, 1913.—*Mr. Turgeon*.....*Not printed.*

104. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, letters and telegrams in the custody of the Department of Railways and Canals, or any other department of the government, between the 1st day of September, 1874, and the 1st day of September, 1879, relating to the acquisition or expropriation of lands at St. Peters, N.S., for canal purposes, and relating to the appointment of valuators to apprise the value of such lands; the instructions to such valuators, the report or reports of such valuators, the area of lands taken, and the price paid for same; and also the amount paid each valuator for his services. Presented 27th January, 1913.—*Mr. Kyte*.....*Not printed.*

105. Return to an Order of the House of the 4th December, 1912, for a copy of all the different freight tariffs in force on the line of railway from Matapedia, Quebec, to New Carlisle, Quebec, and from New Carlisle, to Gascons, Quebec, and vice versa, and of any requests that have been received in regard to the change in the same; and also a copy of any requests, petitions, letters, or other documents complaining of the said tariffs. Presented 27th January, 1913.—*Mr. Marcil (Bonaventure).* *Not printed.*

105*a*. Return to an Order of the House of the 10th December, 1912, for a copy of the different freight tariffs in force on the line of railway from Sunny Brae to Ferrona Junction, on the Intercolonial Railway, and of any requests that have been received in regard to the change in the same, and also a copy of any requests, petitions, letters or other documents complaining of said tariff. Presented 27th January, 1913. —*Mr. Sinclair*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

106. Return to an Order of the House of the 5th December, 1912, for a copy of the original instructions, including maps, specifications, profiles, &c., furnished the engineers on the eastern division of the Transcontinental railway between Winnipeg and Quebec by the chief engineer of the Transcontinental Commission, and approved by the Grand Trunk Pacific Railway Company. Also of all instructions, including specifications and profiles, issued by the chief engineer of the Transcontinental Commission or by the chairman, since 31st October, 1911, which in any way vary, amend, or depart from the original instructions above mentioned. Also, of all correspondence between the Minister of Railways or any official of his department and the chairman of the Transcontinental Commission, or the chief engineer, concerning the departure from the original instructions, either as to the grades, curves and bridges or other permanent structures. Also a copy of all correspondence between the Minister of Railways or any member of the government and any official of the Grand Trunk Pacific Railway Company referring to change of original instructions as regards grades, curves or permanent structures on the said line between Winnipeg and Quebec; and also of all correspondence between the chairman of the Transcontinental Commission or the chief engineer and any official of the Grand Trunk Pacific Railway Company, or any member of its engineering staff, concerning the proposed change of grades, curves, or other permanent structures on the line of the Transcontinental between Winnipeg and the City of Quebec. Presented 30th January, 1913—*Mr. Graham.*
Not printed.

106*a*. Return to an Order of the House of the 7th May, 1913, for a copy of a letter, dated 24th September, 1904, written by Chief Engineer Lumsden of the Transcontinental Commission to Chairman Wade of the same body, in which the former recommended to the latter certain grades on the Transcontinental railway. Presented 15th May, 1913.—*Mr. Graham*.....*Not printed.*

107. Return to an Order of the House of the 29th January, 1913, for a copy of all papers in connection with a claim of L. A. Sauvé to certain buildings at La Pointe des Cascades, on the Soulanges canal, and of all correspondence on the same. Presented 30th January, 1913.—*Sir Wilfrid Laurier*.....*Not printed.*

108. Return to an Order of the House of the 5th December, 1912, for a copy of the contract entered into between the Department of Railways and Canals and W. H. Weller for St. Peters canal improvements, and for a copy of all correspondence between the contractor or any other person, firm or corporation and the Honourable Minister of Railways and Canals relating to the dumping of material removed by the contractor. Presented 30th January, 1913.—*Mr. Kyte*.....*Not printed.*

108*a*. Return to an Order of the House of the 27th January, 1913, for a copy of all correspondence between the Department of Railways and Canals and C. D. Sargent, C.E., and between C. D. Sargent, C.E., and H. G. Stanton, Superintending Engineer of the St. Peters Canal, or between W. H. Weller, contractor for the St. Peters canal improvements, and either or all of said parties relative to work done by the contractor outside of his contract, and the specifications thereof, and also a copy of all correspondence, letters and telegrams between the Department of Railways and Canals or C. D. Sargent, C.E., and any other person, in regard to the same; and of all accounts and vouchers rendered by the contractor to the government of such work, and the payment made by the government to the contractor, specifying whether the same is paid for in full or otherwise. Presented 21st April, 1913.—*Mr. Kyte.*
Not printed.

108*b*. Return to an Order of the House of the 19th March, 1913, for a copy of the accounts of personal expenses paid to Mr. St. Amour, Superintendent of the Soulanges Canal,

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since he entered upon his duties.—Also return to an Order of the House of the 2nd April, 1913, for a copy of all accounts for personal expenses paid by the government to Mr. St. Amour, Superintendent of the Soulanges Canal, since the date of his appointment. Presented 29th April, 1913.—*Mr. Boyer*.....*Not printed.*

109. Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, letters, telegrams, petitions and other documents received since the 1st day of January, 1912, asking that the line of railway known as the Vale Road, should be taken over by the Intercolonial Railway. Presented 30th January, 1913.—*Mr. Macdonald*..... ....*Not printed.*

110. Return to an Order of the House of the 27th January, 1913, for a copy of all correspondence in connection with the issuing of letters patent to the Quebec Railway, Light, Heat and Power Company, Limited, and also said letters patent. Presented 30th January, 1913.—*Mr. Lemieux*.....*Not printed.*

111. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, correspondence, &c., between the Department of Trade and Commerce and Mr. Donnelly, late Canadian Trade Commissioner in Mexico, relating to the closing of the office of such trade commissioner in Mexico. Presented 3rd February, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

112. Return called for by Section 88 of Chapter 62, Revised Statutes of Canada, requiring that the Minister of the Interior shall lay before parliament, each year, a return of liquor brought from any place out of Canada into the territories by special permission in writing of the Commissioner of the Northwest Territories. Presented by Hon. Mr. Roche, 3rd February, 1913.....*Not printed.*

113. Return to an Order of the House of the 22nd January, 1913, for a copy of all letters, telegrams and other papers and documents, relating to the resignation of Lt.-Col. W. F. Moore, 20th Regiment, Halton Rifles, and also of the resignation and the reply thereto. Presented 6th February, 1913.—*Mr. Macdonald*.....*Not printed.*

114. Return to an Order of the House of the 20th January, 1913, for a copy of all letters, papers, telegrams and other documents in connection with the strike of firemen and other men employed on the D.G.S. *Earl Grey*, in the year 1912 and 1913. Presented 11th February, 1913.—*Mr. Macdonald*.....*Not printed.*

115. Return to an Order of the House of the 27th March, 1912, for a copy of all papers, letters and telegrams relating to the applications for, or the granting of, a lease of False Cove Flats, Vancouver, B.C. Presented 11th February, 1913.—*Mr. Macdonald.* *Not printed.*

116. Return to an Order of the House of the 27th January, 1913, for a copy of all correspondence and other papers in connection with a proposed guarantee of bonds to the Quebec and Saguenay railway. Presented 11th February, 1913.—*Mr. Lemieux*....*Not printed.*

116*a*. Return to an Order of the House of the 9th April, 1913, for a copy of all documents, including petitions, memorials, letters and telegrams, addressed to the government, or any of its members, urging it to take over and incorporate into the Canadian government railway system, the Quebec and Oriental Railway and the Atlantic, Quebec and Western Railway, with a copy of all the answers thereto. Presented 20th May, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

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116*b*. Return to an Address to His Royal Highness the Governor General of the 11th December, 1912, for a copy of all orders in council in connection with the construction of a line of railway from St. John to Grand Falls in the Province of New Brunswick, or any portion thereof and also of all plans and profiles filed with the Department of Railways and Canals by the St. John and Quebec Railway Company, and of all correspondence between the Department of Railways and Canals or any official thereof and with the said company or the Government of the Province of New Brunswick, or any official thereof, with reference to the curves, grades or general specifications of the said railway or any portion thereof. Presented 20th May, 1913.—*Mr. Carvell.*

Not printed.

116*c*. Return to an Order of the House of the 28th April, 1913, for a copy of all memorials, petitions, letters, and other documents submitted to the Board of Railway Commissioners from 1st January, 1913, to date, by any party whatsoever regarding the service of the Quebec and Oriental Railway and the Atlantic, Quebec and Western Railway, as to freight, passengers and express matters, with a copy of all orders and rulings issued by such Board and of all correspondence in connection therewith. Presented 20th May, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

117. Return to an Address to His Royal Highness the Governor General of the 5th December, 1912, for a return showing the number of appeals made to the Governor in Council during the twelve months preceding 25th November, 1912, against orders of the Board of Railway Commissioners, the particulars of each appeal, and the decision rendered by the Governor in Council in each case. Presented 11th February, 1913.—*Mr. Graham*.....*Printed for sessional papers only.*

118. Return to an Address to His Royal Highness the Governor General of the 22nd January, 1913, for a copy of all orders in council and of all correspondence relating to the extension of facilities for obtaining information useful to Canadian Trade and Commerce in connection with the British Consular Service. Presented 11th February, 1913.—*Mr. Ames*.....*Not printed.*

119. Return to an Order of the House of the 24th January, 1913, for a return showing all the employees of the different departments at Ottawa, and also in the nine provinces and territories of Canada, and other places outside of Canada, in the inside and outside service, who have left their employment since the 1st October, 1911, up to the 10th January, 1912, inclusively, with their names, Christian names, age, nationality, employment and salaries respectively; the date of their appointment; the date of their leaving; their salaries, the time of their appointment and at leaving; the reasons of their leaving; and if replaced or not; the names, Christian name, age, nationality, employment and salary of those who have replaced them; and in the case of dismissals, a list of the persons who asked for their dismissals; in the case of these replacing them, a list of the persons who recommended their successors Presented 11th February, 1913.—*Mr. Wilson (Laval)*.....*Not printed.*

119*a*. Supplementary return to an Order of the House of the 24th January, 1912, for a return showing all the employees of the different departments at Ottawa, and also in the nine provinces and territories of Canada, and other places outside of Canada, in the inside and outside service, who have left their employment since the 1st October, 1911, up to the 10th January, 1912, inclusively, with their names, Christian names, age, nationality, employment and salaries respectively; the date of their appointment; the date of their leaving; their salaries at the time of their appointment and at leaving; the reasons of their leaving; and if replaced or not; the names, Christian name, age, nationality, employment and salary of those who have replaced them;

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and in the case of dismissals, a list of the persons who asked for their dismissals; in the case of these replacing them, a list of the persons who recommended their successors. Presented 17th March, 1913.—*Mr. Wilson (Laval)*.....*Not printed.*

120. Return to an Address to His Royal Highness the Governor General of the 5th February, 1912, for a copy of all tenders, contracts, reports and other memoranda of the engineers of the Department of Public Works, orders in council, correspondence and all other documents relating to the construction of a dam for storage purposes at the foot of Lake Timiskaming. Presented 12th February, 1913.—*Mr. Pugsley.*
Not printed.

120*a*. Return to an Order of the House of the 4th March, 1912, for a copy of all contracts, correspondence or writings whatsoever, respecting the construction of a dam in 1908 or 1909, called the Lake Timiskaming dam constructed or built over the rivers forming the inflow or the discharge of the said lake, exchanged between the Government of Canada and the contractor or contractors. Presented 12th February, 1913.—*Mr. Boulay*.....*Not printed.*

121. Return to an Order of the House of the 28th March, 1912, for a return giving a list of the subjects of the oil paintings and water colours which have become the property of the National Gallery of Canada since 1891; and the names of the artists in each case. Presented 12th February, 1913.—*Mr. Burnham*.....*Not printed.*

122. Return to an Order of the House of the 27th January, 1913, for a copy of all documents, letters, correspondence, reports, recommendations, &c., relating to the petition of Mr. Firmin Thibault, of St. Denis, County of Kamouraska, for his indemnity for having served at the time of the Fenian invasion. Presented 13th February, 1913—*Mr. Lapointe (Kamouraska)*.....*Not printed.*

123. Return to an Order of the House of the 27th January, 1913, for a return showing what date or dates the government purchased the site for the new Dominion Rifle Range in the County of Carleton, Ontario, from whom were the several parcels of land purchased, and what price per acre was paid for each, the number of acres of land purch sed, and the total amount paid therefor, if any buildings have been erected on the said lands by the government, and the cost thereof, the amounts paid by the government for commissions, fees, agency charges, and legal expenses, and to whom in connection with said purchase, the amount of money expended by the Government on the said range for all purposes, from the date of the original purchase of the land up to 23rd January, 1913, and any sums remaining to be paid in any way connected with the purchase of the said range, to whom and the respective amounts thereof, the distance from the post office in the City of Ottawa to the said range, if any line of electric or other railway runs from the City of Ottawa to the said range, and what means of transportation will be provided for riflemen going to and returning from the said range. Presented 13th February, 1913—*Mr. Wilson (Laval)*.....*Not printed.*

124. Return to an Address to His Royal Highness the Governor General of the 10th February, 1913, for a copy of the memorial presented to the Government during the session of 1911-12, by a delegation from the Government of Prince Edward Island asking for an increased provincial subsidy, a copy of which memorial was laid on the Table of the House by the Finance Minister last session of Parliament, but is not now apparently on the files of the House Presented 17th February, 1913.—*Mr. Hughes (Kings, P.E.I.)*.....*Printed for sessional papers only.*

125. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all papers, letters, telegrams and correspondence between the Government of Canada or any member thereof, since 1st November, 1911, to the pre-

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sent time, with any corporation, company, party or parties, in any way relating to the Customs Tariff upon cement or to the temporary reduction made of the Customs Tariff upon cement; also for a copy of all letters and correspondence by and between members of the Government of Canada during the same period relating to the same subject, and of all papers, documents, memoranda and orders in council relative to the reduction of the Customs Tariff upon cement made by order in council since the close of the last session of parliament. Presented 17th February, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

125*a*. Return to an Address to His Royal Highness the Governor General of the 20th January, 1913, for a copy of all petitions since the 1st of October, 1911, addressed to the Governor General in Council or to any member of the government, asking for a remission and the adjustment of duty on cement, of all letters to the ministers individually on the same, of all correspondence and of all orders in council. Presented 21st February, 1913.—*Sir Wilfrid Laurier*.....*Not printed.*

125*b*. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all papers, documents, petitions, orders in council, letters and telegrams in any department of the government of Canada, or that passed between the Department of Customs and the Department of Justice or any solicitor, counsel, association, company or individual, during the past twelve months, respecting the imposition of tariff duties upon imported lumber dressed on one side and sized, or respecting the interpretation of tariff item No. 504, together with a printed copy of any stated case, appeal, factum or argument used before the Exchequer Court of Canada or the Supreme Court of Canada, in the matter of the judicial interpretation of tariff item No. 504. Presented 4th June, 1913.—*Mr. Maclean (Halifax)*
Not printed.

126. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence passing between the government or any member thereof with respect to the east half of Section 27 in township six (6) in range two (2) west of the third meridian. Presented 17th February, 1913.—*Mr. Martin (Regina)*.....*Not printed.*

127. Return to an Order of the House of the 27th January, 1913, for a return showing when the militia or regular forces was first called out in Canada since Confederation in aid of the civil authorities, how often, when and where has the same been called out since, the amount of money paid by each municipal corporation for such service in each case, what corps called out on each occasion, whether to quell strikes in each instance or for what purpose. Presented 18th February, 1913.—*Mr. Macdonald.*
Not printed.

128. Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence, papers, &c., concerning the application by James McKelvey, of the town of Sarnia, Ontario, for Fenian Raid Volunteer Bounty. Presented 18th February, 1913.—*Mr. Macdonald*.....*Not printed.*

129. Return to an Order of the House of the 10th February, 1913, for a copy of all documents, correspondence, memorandums, reports, requests for inquiries, of the appointment of commissioners and other documents, relating to the study of the causes for the depopulation of country places and the high cost of living in the eastern provinces of the Dominion. Presented 18th February, 1913.—*Mr. Paquet*.....*Not printed.*

130. Return to an Order of the House of the 9th December, 1912, for a copy of all papers, documents, memoranda and correspondence relating to the application of the Banque Internationale to the Treasury Board for a certificate for the commencement of business. Presented 18th February, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

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131. Return to an Order of the House of the 4th December, 1912, for a copy of all papers, documents, telegrams, reports, letters, and instructions regarding smelt and salmon fishing in the Restigouche river and the Baie des Chaleurs since October, 1911, up to date, together with copy of instructions issued to officials of the Department of Marine and Fisheries in that connection. Presented 18th February, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

132. Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence and papers concerning the increase of salary of Mr. Sevigny, employed at the immigration office at Montreal. Presented 18th February, 1913.—*Mr. Carvell.* *Not printed.*

133. Return to an Order of the House of the 5th February, 1913, for a return showing whether any order for goods has been given by the Department of Public Works since 1st October, 1911, at Montreal, Quebec, St. John and Halifax; tenders asked for in each case; orders for goods given without tenders; names of firms, and amounts in each case. Presented 19th February, 1913.—*Mr. Macdonald*.....*Not printed.*

134. Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence and other papers, in the Department of Public Works, concerning the awarding of a contract for a Welsh coal supply to the various Dominion public buildings in Montreal. Presented 19th February, 1913.—*Mr. Lemieux*....*Not printed.*

135. Return to an Order of the House of the 5th December, 1912, for a return showing how many dredging contracts were let by the Department of Public Works during the year 1911-12, the name of each tenderer and the amount of each tender. Presented 19th February, 1913.—*Mr. Lemieux*.....*Not printed.*

135*a*. Return to an Order of the House of the 4th December, 1912, for a return showing the quantity by cubic yards of dredging made in the harbour of Bathurst by the dredge *Restigouche* during the months of May, June, July, August, September, October, and November of the year 1911, and during the same months in the year 1912. Presented 19th February, 1913.—*Mr. Turgeon*.....*Not printed.*

135*b*. Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, documents, recommendations and reports respecting the dredging Des Prairies river, the work done, depth, length and width of channel dredged, the list of men employed to perform that work, their salaries, and the amount of money spent on that work since the 1st of October, 1911, up to the 21st November, 1912. Presented 12th May, 1913.—*Mr. Wilson (Laval)*.....*Not printed.*

135*c*. Return to an Order of the House of the 3rd March, 1913, for a copy of all documents, letters, reports of engineers and a detailed statement of expenditure in connection with dredging at Ste. Anne de Restigouche and Cross Point, Bonaventure County. Presented 4th June, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

135*d*. Return to an Order of the House of the 19th March, 1913, for a return showing the amount of dredging done by the government dredges for private parties or firms in Prince Edward Island, during the season of 1912; the names of the parties or firms for whom this dredging was done; the number of yards of material dredged for each party or firm; the class of material dredged, and the price per yard the government charged for this dredging; who measured the material dredged, and whether it was scow measurement that was made; who recommended the said dredging to be done; if the resident engineer or any engineer was consulted in regard to the measuring, and if the resident engineer or any engineer had control over the matter at all. Presented 6th June, 1913.—*Mr. Hughes (Kings, P.E.I.)*.....*Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

136. Return to an Order of the House of the 9th December, 1912, for a copy of the accounts of Jean Baptiste Lena and of his wife, for work done to the public buildings at Valleyfield, Quebec, in May, 1912; also for a copy of all correspondence, reports and documents relating to the payment in full or a part of their accounts. Presented 19th February, 1913.—*Mr. Papineau*.....*Not printed.*

137. Return to an Order of the House of the 4th December, 1912, for a return showing the amount of money expended in improving the channel of the Ottawa river between the city of Hull and the village of Masson. Presented 19th February, 1913.—*Mr. Devlin.* *Not printed.*

138. Return to an Order of the House of the 4th December, 1912, for a copy of all documents relating to the transferring of P. E. Amiot, resident engineer of the Department of Public Works, Bonaventure, Quebec, to the district of Chicoutimi and Saguenay, and the appointment in his stead, in Bonaventure County, of Charles E. Tache, of Chicoutimi, as resident engineer, with a copy of all the instructions given to the latter and his duties, residence and salary. Presented 19th February, 1913.—*Mr. Mareil (Bonaventure)*.....*Not printed.*

139. Return to an Order of the House of the 4th December, 1912, for a copy of all petitions, correspondence, memoranda, reports, and resolutions of county or other municipal councils of Bonaventure County asking or objecting to certain public works in Bonaventure County since October, 1911, with the Minister of Public Works, or any member of the present administration, and replies made thereto. Presented 19th February, 1913.—*Mr. Mareil (Bonaventure)*.....*Not printed.*

140. British Canadian Loan and Investment Company, Limited, Toronto, for year 1911.—*(Senate)*.....*Not printed.*

141. Claims of present fish warden, Baker Lake, County of Madawaska, N.B.—*(Senate)*. *Not printed.*

141*a*. Return to an Order of the House of the 29th January, 1913, for a copy of all letters, telegrams, reports, information, convictions and other documents in the possession of the Department of Marine and Fisheries or any officer thereof relating to the prosecution in the year 1910, against George Rowlings and James Rowlings, of Musquodoboit Harbour, County of Halifax, for a violation of the fishery regulations. Presented 21st May, 1913.—*Mr. Sinclair*.....*Not printed.*

141*b*. Return to an Order of the House of the 29th January, 1913, for a copy of all papers, letters, telegrams and documents or other communications, had with the Department of Marine and Fisheries or any official thereof, in regard to the prosecutions against the following parties:—Samuel Stewart, Melvin Hart, Andrew McNeil, Thomas McNeil, Hugh Malcolm, Tom Moffatt, James Waddin, Samuel Wright and Dougald Higgins, of Westville, County of Pictou, for infractions of the Fisheries Act, and of any applications or letters relative to relief from the fines imposed or the return of the same; and also of all papers, letters, and other documents relating to a charge against Rod. Martin, of Westville aforesaid, a fishery guardian, for illegal fishing and other offences. Presented 21st May, 1913.—*Mr. Macdonald*.....*Not printed.*

141*a*. Claims of Messrs. Boulanger and Son, Montmagny, Quebec.—*(Senate)*....*Not printed.*

142. Copy of Report of Minister of Justice in *re* Florence Mining Company.—*(Senate)*. *Not printed.*

CONTENTS OF VOLUME 27—*Continued.*

143. Instruction sent to the different Lieutenant Governors of different provinces of Canada, with commissions.—(*Senate*)..... .....*Not printed.*

144. Return to an Order of the House of the 15th January, 1913, for a copy of all papers, letters, documents, telegrams, reports and opinions in relation to the claim of William Iceton, of Purcell's Cove for a return of a boat from the Department of Marine and Fisheries or any other department. Presented 20th February, 1913.—*Mr. Macdonald* ....*Not printed.*

145. Return to an Address to His Royal Highness the Governor General of the 9th December 1912, for a copy of all papers, telegrams, letters and orders in council respecting the transfer of the property known as the Police Point Reserve to the corporation of the City of Medicine Hat, Alberta. Presented 20th February, 1913.—*Mr. Buchanan.* *Not printed.*

146. Return to an Order of the House of the 29th January, 1913, for a copy of the inquiry made by F. B. Atkinson, Lévis, as to an accident that happened to the horse of Arsene Lauzier, at Amqui, County of Rimouski, on the 19th February, 1912. Presented 20th February, 1913.—*Mr. Boulay*.....*Not printed.*

147. Correspondence, memoranda, &c., in respect to the issue of a patent for the N. ½ of S. W. ¼ of section 8, in township 49, range 26, west of the 2nd meridian, to one Arthur Donaldson, bearing date the 19th November, 1912. Presented by Hon. Mr. Roche, 20th February, 1913..... .....*Not printed.*

147*a*. Return to an Order of the House of the 12th February, 1913, for a copy of all letters, telegrams and other documents with respect to the north half of the southwest quarter of section eight (8), township forty-nine (49), range twenty-six (26), west of the second meridian, province of Saskatchewan, and the granting of a homestead entry for the said land to one Arthur Donaldson. Presented 6th June, 1913.—*Mr. Martin (Regina)*..... .....*Not printed.*

148. Return to an Order of the House of the 12th February, 1913, for a copy of all papers, reports and other documents relating to the delay of the Indian Department in issuing patents for lands purchased from the St. Peters band of Indians, and forming part of the St. Peters Indian reserve, Manitoba. Presented 25th February, 1913. —*Mr. Oliver*..... .....*Not printed.*

149. Return an Address to His Royal Highness the Governor General of the 27th January, 1913, for a copy of all applications addressed to the Government by the Algoma Steel Company for remission of duties on rails imported by the said company at Fort William; of all correspondence on the same, of all evidence sought and obtained by the government and supplied by the company in support of its application; and of all orders in council ordering such remission of duties. Presented 25th February, 1913.—*Sir Wilfrid Laurier*..... .....*Not printed.*

150. Return to an Order of the House of the 24th February, 1913, for a return showing the stenographers and secretaries of the House of Commons, and the names of the members for whom each of them work. Presented 26th February, 1913.—*Mr. Boulay.* *Not printed.*

150*a*. Return to an Order of the House of the 31st March, ultimo, for a return giving the names and home addresses of the persons employed in the House of Commons as stenographers to members. Presented 1st April, 1913.—*Mr. Martin (Regina).* *Not printed.*

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151. Return to an Order of the House of the 16th January, 1913, for a return showing the number of bushels of grain and barrels or sacks of flour which were shipped from Montreal, Quebec, St. John, N.B., and Halifax, for twelve months preceding the 31st day of December, 1912; the kinds of each product respectively, and the quantities of said commodities at each of above points which were domestic and foreign. Presented 26th February, 1913.—*Mr. Bennett (Simcoe)*.....*Not printed.*

152. Return to an Order of the House of the 19th February, 1913, for a return showing in detail the quantity and values, respectively, of the imports and exports of Canada with Great Britain, United States, Australia and New Zealand, during the year ending 31st March, 1912, in horses, cattle, sheep, hogs, bacon, hams, fresh and salted beef, lard, tallow, mutton, canned meats, butter, cheese, eggs, poultry and apples. Presented 26th February, 1913.—*Mr. Sutherland*.....*Not printed.*

153. Return to an Address to His Royal Highness the Governor General of the 26th February, 1912, for a copy of all letters, documents and correspondence relating to action by the Government in regrd to the relief of the shareholders and depositors of the Farmer's Bank, and of the order in council appointing Sir William Meredith as Commisioner, and all correspondence in relation thereto. Presented 26th February, 1913. —*Mr. Macdonald*.....*Not printed.*

153*a*. Report of the Honourable Sir William Ralph Meredith, Kt., Commissioner appointed to make investigation into all matters connected with the Farmers Bank of Canada. Presented by Hon. Mr. White, 26th February, 1913.

Printed for distribution and sessional papers.

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(This volume is bound in three parts.)

153*b*. Report of Royal Commission authorized by orders in council dated 19th day of July, 1912, and the 5th day of August, 1912, to inquire into alleged complaints as to methods of weighing butter and cheese in Montreal, and also as to the methods of payment. Presented by Hon. Mr. Burrell, 30th May, 1913.

Printed for distribution and sessional papers.

154. Return to an Order of the House of the 27th January, 1912, for a return showing the amount of the subsidy paid to each of the four original provinces of the Dominion at Confederation, and the population on which such payment was based; the subsidy payable to each of the remaining five provinces on entering the union, and the population on which such payment was based; the sum added to the subsidy of any province as better terms, and the date which such addition was made respectively; the details of each readjustment of subsidies since 1867, and the yearly subsidy at present payable to each province, with the population on which such payment is based, and the original debt allowance, if any, respectively, placed to the credit of each province on entering the union. Presented 27th February, 1913.—*Mr. Sinclair.*

Printed for sessional papers only.

155. Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence in regard to the disposition of the Marine Hospital at Pictou to the town of Pictou, or any other corporation or person. Presented 27th February, 1913.—*Mr. Macdonald*.....*Not printed.*

156. Return to an Order of the House of the 29th January, 1913, for a copy of all letters, tenders, contracts, papers and other documents in the possession of the Department of Marine and Fisheries relating to the making and cancellation of a contract or agreement between the said department and one Charles G. Giffin, of Isaac Harbour,

CONTENTS OF VOLUME 28.—*Continued.*

N.S., to perform certain services for the lobster hatchery at that place, and also relating to a subsequent agreement with one Philip McArthur to perform similar duties. Presented 27th February, 1913.—*Mr. Sinclair*.....*Not printed.*

157. Return to an Order of the House of the 29th January, 1913, for a copy of all papers and correspondence concerning the claim of Charles Mennier, ex-Collector of Customs at Marieville, Quebec, for rent. Presented 28th February, 1913.—*Mr. Lemieux.*
Not printed.

158. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, correspondence, documents and reports relating to the closing of the post office at Pomket river, Antigonish County, Nova Scotia, and the cancellation of the contract for the carrying of the mail between Heatherton and Pomket river. Presented 28th February, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

158*a*. Return to an Order of the House of the 27th January, 1913, for a copy of all letters, telegrams, petitions and other correspondence and documents received by the Post Office Department during the last twelve months from the honourable member for East Grey and others, relating to the closing of the post office at Harkaway, County of Grey, province of Ontario, and of the proposed change in the mail service. Presented 25th March, 1913.—*Mr. Lanctot*.....*Not printed.*

159. Claims put forth by and on behalf of Indians of British Columbia—Report of James T. McKenna on.—(*Senate*).....*Not printed.*

159*a*. Return to an Address to His Royal Highness the Governor General of the 20th January, 1913, for a copy of all correspondence between the Government of British Columbia and the Government of Canada concerning the rights and claims of the Indians in the province, and of all orders in council with regard to the same. Presented 14th May, 1913.—*Sir Wilfrid Laurier*.....*Not printed.*

159*b*. Return to an Order of the House of the 28th April, 1913, for a copy of all correspondence, reports and recommendations from Rev. R. L. Macdonald, Indian agent at Salmon River reserve, Richmond County, N.S., relating to the Indian school in said reserve; and of all correspondence and instructions from the Department of Indian Affairs to the said Indian agent, relating to the same; also a copy of all complaints, charges and reports against Miss Charlotte M. Devereaux, teacher of the said school, and of all correspondence and recommendations relating to the appointment of Earnest McNeil to succeed her, since 1st January, 1912. Presented 23rd May, 1913.—*Mr. Kyte*.....*Not printed.*

159*c*. Return to an Order of the House of the 12th May, 1913, for a copy of the last surrender and of all papers, correspondence and other documents in connection with the surrender of part of the White Bear Indian Reserve; together with a copy of all letters and telegrams referring to this surrender by officials of the Department or others, and of the authority on which this surrender was taken, the number of acres surrendered, and how disposed of. Presented 23rd May, 1913.—*Mr. Bradbury.*
Not printed.

159*d*. Return to an Order of the House of the 30th April, 1913, for a copy of all letters, papers, memoranda and other documents, dated since 1st January, 1912, relating to the Kitsilano Indian Reserve in the City of Vancouver. Presented 23rd May, 1913.—*Mr. Oliver*.....*Not printed.*

160. Immigrants—number of, who settled in Canada, in 1911-12, and from whence.—(*Senate*).
Not printed.

CONTENTS OF VOLUME 28.—*Continued.*

160a. Return to an Order of the House of the 7th May, 1913, for a return showing the number of immigrants coming into Canada during the year ending 31st March, 1913, inspected by the government medical inspectors; the total cost of such medical inspections; the number of medical doctors employed by the government during that period; the name, salary and location of each, including those resident in Ottawa. Presented 6th June, 1913.—*Mr. Schaffner*.....*Not printed.*

161. Correspondence with Mr. V. Steffansson concerning northern expedition. Presented by Hon. Mr. Hazen, 3rd March, 1913.....*Not printed.*

161a. Copy of order in council No. P.C. 406 of the 22nd February, 1913, with reference to Mr. V. Steffansson's proposed northern expedition. Presented by Hon. Mr. Hazen, 10th March, 1913.....*Not printed.*

162. Return to an Address to His Royal Highness the Governor General of the 25th March, 1912, for a copy of all letters, requests, petitions, orders in council and other documents in the possession of the Department of Marine and Fisheries relating to the change in the fishery regulations by which steam trawlers were prohibited from participating in the fishing bounty. Presented 3rd March, 1913.—*Mr. Sinclair.*
Not printed.

162a. Return to an Address to His Royal Highness the Governor General, of the 10th February, 1913, for a copy of all petitions, correspondence, reports of experts or officers, of orders in council, minutes of council, and of other papers and documents in the possession of the Department of Marine and Fisheries, or any department of the government, relating to steam trawling on the Atlantic seaboard. Presented 15th April, 1913.—*Mr. Sinclair*.....*Not printed.*

163. Return to an Order of the House of the 19th February, 19'3, for a copy of all correspondence, papers, accounts, vouchers, concerning the purchase and subsequent repairs of a private car by the Department of Militia and Defence, from the Canadian Northern Railway Company. Presented 3rd March, 1913.—*Mr. Lemieux.*
Not printed.

164. Return to an Order of the House of the 24th February, 1913, for a return showing separately the amount paid by the Department of Indian Affairs for medical attendance on account of the Indians on the Micmac reserve of Ste. Anne de Restigouche, Quebec, for each year from 1900 to 1913, inclusive, and to whom paid. Presented 10th March, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

165. Return to an Order of the House of the 19th February, 1913, for a copy of all correspondence, letters, telegrams and other documents relative to the sale of alleged Indian lands at Nyanza, riding of North Cape Breton and Victoria, N.S., to one Philip McDonald, such sale having taken place about the year 1877. Presented 17th March, 1913.—*Mr. McKenzie*.....*Not printed.*

165a. Return to an Order of the House of the 7th May, 1913, for a return showing the number of acres surrendered by the Coté's Band of Indians, the number of acres sold by private sale, the number of acres still unsold; together with a copy of all letters from persons who made application for purchase of surrendered lands in Coté's reserve, or from any person on behalf of purchasers and replies thereto; and of all reports, letters or memoranda addressed to the Superintendent General of Indian Affairs, from any officer of the department respecting the private sale of said lands; also a copy of any document or documents covering the authority under which these lands were sold by private sale, and of all letters addressed to the department, or any officer of department, respecting the sale of said lands. Presented 3rd June, 1913.—*Mr. Bradbury*.....*Not printed.*

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166. Return to an Order of the House of the 12th February, 1913, for a copy of all letters, reports and other documents received by the Minister of Labour regarding labour conditions on the Grand Trunk Pacific between Tête Jaune Cache and Fort George. Presented 17th March, 1913.—*Mr. Oliver*.....*Not printed.*

167. Return to an Address to His Royal Highness the Governor General of the 3rd February, 1913, for a copy of all telegrams, letters and other documents passing between the Government of Canada, or any member thereof, and the Government of the Province of Saskatchewan, or any member thereof, with respect to chapter 17 of the statutes of Saskatchewan, 1912, being an Act to prevent the employment of female labour in certain capacities. Presented 17th March, 1913.—*Mr. Martin (Regina)*.....*Not printed.*

168. Return to an Order of the House of the 10th December, 1912, for a copy of all correspondence, petitions and other papers received by the Prime Minister, or any member of the government, since the 1st April, 1912, in connection with the school system established in that portion of the Keewatin Territory annexed to the province of Manitoba. Presented 17th March, 1913.—*Mr. Macdonald*.....*Not printed.*

169. Return to an Order of the House of the 29th January, 1913, for a return showing the number of accidents to lock gates or bridges on the Welland Canal during the year ending 25th November, 1912, the nature of the accidents, the amount of damage in each case and the amount recovered by the Government from vessel owners in each instance. Presented 18th March, 1913.—*Mr. Graham*.....*Not printed.*

170 Return to an Order of the House of the 3rd March, 1913, for a copy of the contract passed on the 6th day of August, 1910, between the City of Quebec and the Transcontinental Railway Commissioners, for the acquisition by the latter of the property known as Champlain Market, to be used as a station and terminals for the said railway; of all the correspondence between the said city and the present Commissioner of the said railway, with the Minister of Railways, or any other Minister, with regard to the non-execution of the said contract by the said commission. Presented 18th March, 1913.—*Sir Wilfrid Laurier*.....*Printed for sessional papers only.*

171. Return to an Order of the House of the 29th of January, 1913, for a copy of all letters, correspondence, &c., respecting the request for suspension by H. Boulay, of J. Stahl, assistant inspector of immigration on the railway. Presented 19th March, 1913.—*Mr. Boulay* ....*Not printed.*

172. Return to an Order of the House of the 17th February, 1913, for a return showing the total area of land thrown open for pre-emption and purchased homesteads in each of the provinces of Saskatchewan and Alberta since the passing of the Dominion Lands Act of 1908; also the number of acres of such lands which have been disposed of by way of pre-emptions and purchased homesteads in each of the said provinces, the amount of principal money collected on account of such lands in each of the said provinces up to 31st December, 1912, and the amount of interest collected on account of such lands in each of the said provinces to 31st December, 1912. Presented 19th March, 1913.—*Mr. Martin (Regina)*.....*Not printed*

173. Return to an Order of the House of the 10th February, 1913, for a copy of all letters, correspondence, memorials and other documents received by the Right Honourable the Prime Minister and the Honourable the Minister of Justice, since the 1st day of January, 1912, relating to the request by county court judges for an increase of salary and for an amendment to the Judges Act with respect to retiring allowances. Presented 26th March, 1913.—*Mr. Proulx*.....*Not printed.*

CONTENTS OF VOLUME 28.—*Continued.*

174. Return to an Order of the House of the 13th February, 1913, for a return showing the names of the keepers in Portsmouth penitentiary, and their religious belief; the names of any of the said keepers who may have been dismissed, the date, charges and on whose recommendation were they reinstated. Presented 26th March, 1913.—*Mr. Edwards*.....*Not printed.*

174a Return to an Order of the House of the 13th February, 1913, for the name of the discipline officer in charge of each of the following departments in Portsmouth penitentiary, the date when each was first appointed on the penitentiary staff, the date to his present position, and the religious belief of each: Quarry, farm, warden's residence and grounds, blacksmith shop, bath room and laundry, stone shed, tailor and shoe shop, changing room, stone pile, sewage plant, asylum ward, cell wings, library and Roman Catholic and Protestant chapels, hospital, shop dome, carpenter, tin and paint shop, and prison of isolation. Presented 26th March, 1913.—*Mr. Edwards.*
Not printed.

175. Return to an Order of the House of the 17th February, 1913, for a copy of all statements of account for salary or remuneration to the Commissioner, and his expenses, for witness fees and all other expenses in connection with the investigations by Commissioner Duchemin, of the following persons in Antigonish County namely: Patrick M. Deroste, deckhand SS. *Scotia*, Harbour au Boucher; William R. Fougère, sectionman, Harbour au Bouche; Allen Kinney, sectionman, Linwood; Hubert Myatte, sectionman, Tracadie; John McDonell, sectionman, Afton Station; John W. Malanson, sectionman, Afton; James Armstrong, sectionman, Heatherton; Charles Landry, sectionman, Pomket; William S. Landry, section foreman, Pomket; Colin McDonald, sectionman, James River; Archibald Chisholm, station agent, Heatherton; Joseph Benoit, station agent, Pomket; Alex. R. McAdam, fishery officer, Malignant Cove; Alex. McDonald, sub-collector, Doctors Brook; Charles L. Gass, sub-collector, Bayfield; Jeffrey M. Crispo, sub-collector, Harbour au Bouche; Hugh R. McAdam, postmaster, Arisaig; Thomas J. Sears, postmaster, Lochaber, Charles L. Gass, postmaster, Bayfield; and Joseph P. Benoit, postmaster, Pomquet; also the expenses in detail, of and incidental to the investigation by said Commissioner Duchemin of the charges made against John J. McDonald, postmaster, McArra's Brook; Archibald Stewart, section foreman, Harbour au Bouche; Ronald McFarlane, section foreman, Williams Point; Henry Williams, sectionman, Marshy Hope; and John W. McInnes, bridge foreman Intercolonial Railway, Antigonish. Presented 26th March, 1913.—*Mr. Chisholm (Antigonish)*.....*Not printed.*

175a. Return to an Order of the House of the 28th April, 1913, for a return showing the date of the appointment of H. P. Duchemin, Investigating Commissioner for Eastern Nova Scotia; the number of days he has been employed by the government since the appointment; the gross amount paid to Mr. Duchemin as an allowance for his services, excluding travelling expenses or other outlay; the amount which has been paid to Mr. Duchemin to date for travelling expenses, living expenses, witness fees, and other sundry expenses, respectively. Presented 21st May, 1913.—*Mr. Sinclair.*
Not printed.

176. Return to an Order of the House of the 4th December, 1912, for a copy of the report or reports made by C. E. Taché, resident engineer of Bonaventure County, Quebec, on public works existing or asked for in that constituency since October, 1911, up to date. Presented 28th March, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

177. Return to an Order of the House of the 6th February, 1913, for a return showing what properties within the area north of Wellington street and west of Bank street, in the City of Ottawa, have been purchased or acquired by the Government; from whom the said purchases were made, and the price paid, or agreed to be paid, in each case; the

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number of said properties not yet paid for, the names of the owners thereof, and amount, if any, in dispute in each case; the names of the persons who were employed in any capacity, or for any purpose, in connection with the purchase of the said properties, and the terms of their employment; the amount which has been paid to each, and further amounts to be paid to such persons, giving their respective names; whether the Government has employed any persons or agents to collect rent from the tenants or occupants of any of the said properties, if so, the names of such rent collectors, for what period employed, and amount by way of salary, fees, or commission, paid to each; the total amount paid by the Government up to 31st January, 1913, in connection with the purchase or acquisition of the said properties. Presented 28th March, 1913.—*Mr. Murphy* .....*Not printed.*

178. Return to an Order of the House of the 24th January, 1913, for a copy of all correspondence between the Minister of Public Works and H. Morel, M.P.P., for East Nipissing, in any way relating to the construction of a road or highway from North Bay to Sturgeon Falls, Ontario; and of all petitions, correspondence, surveys, and engineers' reports in any way connected with the building of the said road or highway. Presented 28th March, 1913.—*Mr. Murphy*.....*Not printed.*

179. Return to an Order of the House of the 4th December, 1912, for a copy of all pay-lists, letters, documents, telegrams and other papers in connection with the expenditures made on Brulé wharf in the County of Colchester during the last two years. Presented 28th March, 1913.—*Mr. Macdonald*.....*Not printed.*

179*a*. Return to an Order of the House of the 10th December, 1912, for a copy of all papers, documents, tenders and correspondence relating in any way to the construction of a wharf at Kraut Point, Lunenburg County, N.S. Presented 28th March, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

180. Return to an Order of the House of the 29th January, 1913, for a copy of all correspondence, papers, &c., concerning the application made by the Eastern Canada Power Company, with a view to raise the head of the River St. Lawrence in the vicinity of Coteau, Cedar, Split Rock and Cascade rapids to the level of the water in Lake St. François. Presented 28th March, 1913.—*Mr. Lemieux*.....*Not printed.*

181. Return to an Order of the House of the 4th December, 1912, for a copy of all correspondence, letters and telegrams addressed by the Conservative candidate in the County of Gloucester at the election of 21st September, 1911, to the Minister of Public Works from the day he took his oath of office, on 10th October, 1911, up to the 31st December, of the same year, on the subject of public works then under construction in the said county. Presented 28th March, 1913.—*Mr. Turgeon*.....*Not printed.*

182. Return to an Order of the House of the 10th March, 1913, for a return showing the number of men of the R. C. regiment at Aldershot, during the summer of 1912, previous to the regular militia camp; date of going into camp; number there during said time; whether tenders for supplies for these men were called for; number of tenders received and from whom; if any contracts were awarded on said tenders and, if not, what was done with the said tenders; how and from whom were supplies for these men obtained; the prices paid during said time per pound respectively, for meat, sugar, butter, tea, coffee bacon, bread, and how much per bushel for vegetables; the cost per ration for supplies for said men of the R. C. regiment at Aldershot camp during the time aforesaid; the cost per ration for supplies to the regular militia camp under contract during the annual drill in the fall of 1912. Presented 28th March, 1913.—*Mr. Kyte*.....*Not printed.*

CONTENTS OF VOLUME 28.—*Continued.*

183. Report on wholesale prices in Canada, 1912, by R. H. Coats, B.A., F.S.S., editor of the *Labour Gazette*. Presented by Hon. Mr. Crothers, 28th March, 1913....*Not printed.*

184. Area of territories added to Ontario and Quebec, by Statutes of 1912.—(*Senate*). *Not printed.*

185. Relating to recent increase in prices charged Canadian fishermen for manilla cord.—(*Senate*).....*Not printed.*

186. Report of the Pilotage Commission of Quebec. Presented by Hon. Mr. Hazen, 28th March, 1913.....*Not printed.*

187. Return to an Order of the House of the 26th February, 1913, for a copy of all memoranda, letters, papers, telegrams and other documents in the possession of the Department of the Interior relating to the S. W. 36-16-27, W. 2. Presented 31st March, 1913.—*Mr. Knowles*.....*Not printed.*

187*a*. Return to an Order of the House of the 3rd March, 1913, for a copy of all correspondence, telegrams and other papers in connection with the southwest ¼ of 4-9-14 west of 2nd meridian. Presented 10th April, 1913.—*Mr. Bradbury*.....*Not printed.*

187*b*. Return to an Order of the House of the 26th March, 1913, for a copy of all papers, letters, memoranda and other documents relating to the northwest of 30-25-7-2. Presented 25th April, 1913.—*Mr. Oliver*.....*Not printed.*

187*c*. Return to an Order of the House of the 3rd March, 1913,—1. For a copy of all correspondence and other papers in connection with the disposal of the following lands and the claim of James W. Brown in connection with these lands:—

Part of S.E. ¼ section 21-20-21-W. 2nd meridian, area 5/100ths acre.
Part of N.E. ¼ section 21-20-21-W. 2nd meridian, area 11 6/100ths acre
Part of S.E. ¼ section 20-20-21-W. 2nd meridian, area 80 acres.
Part of S.W. ¼ section 28-20-21-W. 2nd meridian, area 72 42/100ths acres.
Whole of S.E. ¼ section 28-20-21-W. 2nd meridian, area 160 acres.
Whole of N.E. ¼ section 32-20-21-W. 2nd meridian, area 160 acres.
Part of S.E. ¼ section 32-20-21-W. 2nd meridian, area 80 acres.
Whole of N.W. ¼ section 5-21-21-W. 2nd meridian, area 160 acres.
Whole of S.E. ¼ section 5-21-21-W. 2nd meridian, area 160 acres.
Part of N.E. ¼ section 5-21-21-W. 2nd meridian, area 123 85/100ths acres.
Whole of S.W. ¼ section 5-21-21-W. 2nd meridian, area 160 acres.

2. Also of all papers in connection with the disposal of the whole of the northwest quarter-section 22-20-21, west of the second meridian; and part of S.W. ¼, 2-20-21-W. of the second meridian; and of all correspondence and papers in connection with Alexander Hurst Brown's claim *re* these lands. Presented 30th April, 1913.—*Mr. Bradbury*.....*Not printed.*

187*d*. Return to an Order of the House of the 9th April, 1913, for a copy of all letters, papers, telegrams and other documents in connection with the sale of the N.W. quarter-section 29 10-18-W. Presented 13th May, 1913.—*Mr. Turriff*.....*Not printed.*

187*e*. Return to an Order of the House of the 28th April, 1913, for a copy of all letters, memoranda and other documents relating to the northeast quarter of 14-75-15-5, during the years 1911, 1912, and 1913 to date. Presented 13th May, 1913.—*Mr. Oliver*. *Not printed.*

CONTENTS OF VOLUME 28.—*Continued.*

187*f*. Return to an Order of the House of the 31st March, 1913, for a copy of all papers, telegrams, applications, and other documents in connection with the S.W. 2-19-20, west 2nd M. Homestead, patented 3rd June, 1892; the S. ½ of N.E. 20-20-21, west 2nd M. patented 11th October, 1904, N.W.H.B., as assignee of Edward Boucher; the S.E. ¼ of 22-20-21, west 2nd M., N.W.H.B., patented 22nd September, 1900, as assignee of Louis McGillies; the S.E. ¼ of 28-20 21, west 2nd M., N.W.H.B., patented 26th August, 1901, as assignee of J. Bte. Fagant, jr., and the E. ½ of S.E. ¼ of 32-20-21, west 2nd M., N.W.H.B., patented 11th September, 1901, as assignee of Jos. Alexander; and of all papers in connection with any claims of G. W. Brown or others in connection with these lands. Presented 3rd June, 1913.—*Mr. Bradbury*.....*Not printed.*

187*g*. Return to an Order of the House of the 31st March, 1913, for a copy of all papers, telegrams, applications and other documents regarding the S.W. ¼, 28-20-21, west 2nd M., N.W.H.B., patented 1st March, 1909, as assignee of Norbert Bellehumeur; and the W. ½ of S.E. ¼, 32, 20, 21, west 2nd M., N.W.H.B., patented 1st March, 1909, as assignee of Norbert Bellehumeur; and of all papers in connection with any claims by Norman McKenzie or others against the Government in connection with these lands. Presented 4th June, 1913.—*Mr. Bradbury*.....*Not printed.*

188. Return to an Order of the House of the 10th March, 1913, for a copy of all correspondence or communication of any kind between the Department of Insurance at Ottawa and the Department of Insurance at Toronto since June, 1907, touching the transfer of the Canadian Guardian Life Insurance Company from the jurisdiction of the Insurance Department at Ottawa to that of the jurisdiction of the Insurance Department at Toronto; of all correspondence, if any, between the Insurance Department at Ottawa and the *Saturday Night*, newspaper of Toronto, touching the affairs of the Canadian Guardian Life Insurance Company or the International Insurance Company, Limited; and of all correspondence and other communications between the Department of Insurance at Ottawa and the Government of the province of Alberta in reference to the affairs of the Canadian Guardian Life Insurance Company or the International Insurance Company, Limited. Presented 31st March, 1913.—*Mr. German.*
Not printed.

189. Copy of an Order in Council, &c., respecting a contribution of $30,000 to assist in alleviating the distress of the sufferers by the disastrous cyclone which swept over the City of Regina and its vicinity. Presented by Hon. Mr. White, 31st March, 1913.
Not printed.

190. Copy of correspondence respecting the Treaty of Commerce and Navigation between the United Kingdom and Japan. Presented by Hon. Mr. Borden, 1st April, 1913.
Printed for sessional papers only.

190*a*. From Imperial Consulate General of Japan for the Dominion of Canada. The undersigned, His Imperial Majesty's Consul General at Ottawa, duly authorized by His Government, has the honour to declare that the Imperial Japanese Government are fully prepared to maintain with equal effectiveness the limitation and control which they have since 1908 exercised in the regulation of emigration from Japan to Canada. 11th April, 1913. Presented by Hon. Mr. Borden, 11th April, 1913.....*Not printed.*

191. Copy of the order in council in connection with the appointment of a Commission to inquire into the claims of the province of British Columbia for exceptional treatment. Presented by Hon. Mr. Borden, 1st April, 1913.....*Printed for sessional papers only.*

191*a*. Memorandum *re* British Columbia's claims for special consideration. Presented by Hon. Mr. Borden, 1st April, 1913.....*Printed for sessional papers only.*

CONTENTS OF VOLUME 28.—*Continued.*

191*b*. Copies of orders in council, &c., relating to the appointment of commissioners to adjust all matters relating to Indian lands and Indian affairs generally in the province of British Columbia. Presented by Hon. Mr. Borden, 17th April, 1913.
Not printed.

191*c*. Report of the Royal Commission appointed to inquire into and report upon the law respecting pilotage and its administration in the pilotage districts of Montreal and Quebec; and what changes, if any, are desirable therein; and also, a letter addressed to the Minister of Marine and Fisheries from Mr. Ajutor Lachance, one of the commissioners. Presented by Hon. Mr. Hazen, 18th April, 1913.....*Not printed.*

191*d*. Report of Royal Commission on Industrial Training and Technical Education, Parts I, II, III. and IV. Presented by Hon. Mr. Crothers, 4th June, 1913.
Printed for distribution and sessional papers.

192. Return to an Order of the House of the 24th February, 1913, for a copy of all memoranda, letters, papers and documents relating to the setting apart of a forest reserve on the north side of the Saskatchewan river opposite the City of Prince Albert. Presented 2nd April, 1913.—*Mr. Oliver*.....*Not printed.*

192*a*. Return to an Order of the House of the 26th February, 1913, for a copy of all memoranda, reports, letters, and other documents of any kind in the possession of the Department of the Interior relating to the suitability for forest reserve or for homesteading purposes, of the whole or any part of townships 24 and 25, range 27, west of the first meridian, now forming part of the Riding Mountain Forest Reserve. Presented 11th April, 1913.—*Mr. Oliver*.....*Not printed.*

193. Return to an Order of the House of the 10th February, 1913, for a copy of all correspondence exchanged between the Department of Marine and Fisheries and the member for Temiscouata, and all other persons, respecting the placing of a light or line of lights on wharf at Ile Verte, County of Temiscouata. Presented 4th April, 1913.—*Mr. Paquet*.....*Not printed.*

194. Copy of a report of the Committee of the Privy Council, approved by His Excellency the Administrator, on the 5th April, 1913, relative to a contract for an ocean mail, passenger and freight steamship service between Canada and Great Britain and Great Britain and Canada, together with the articles of agreement for the said service. Presented by Hon. Mr. Pelletier, 7th April, 1913.....*Not printed.*

195. Return to an Order of the House of the 10th March, 1913, for a statement showing the total volume of trade, in import and export, respectively, between Canada and Newfoundland for each year during the period from the 1st day of January, 1896, to the 1st day of January, 1913, and of what the said trade consisted of each year.

2. The volume of trade between Newfoundland and the West Indian Islands, included in the West Indian trade agreement with Canada, dated the 9th day of April, 1912, during the years 1909, 1910, 1911 and 1912, in import and export, and of what the said import and export consisted of each year. Presented 10th April, 1913.—*Mr. McKenzie.*
Not printed.

195*a*. Supplementary return to an Order of the House of the 10th March, 1913, for a statement showing the total volume of trade, in import and export, respectively, between Canada and Newfoundland for each year during the period from the 1st day of January, 1896, to the 1st day of January, 1913, and of what the said trade consisted of each year.

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2. The volume of trade between Newfoundland and the West Indian Islands, included in the West Indian trade agreement with Canada, dated the 9th day of April, 1912, during the years 1909, 1910 1911 and 1912, in import and export, and of what the said import and export consisted of each year. Presented 21st April, 1913.—*Mr. McKenzie* ....*Not printed.*

196. Return to an Order of the House of the 9th December, 1912, for a copy of all letters, telegrams, and correspondence referring in any way to the purchase or leasing of the property in Antigonish, N.S., now in use as a gun shed or store house for the equipment of the 18th Field Battery of Artillery. Presented 14th April, 1913.—*Mr. Chisholm (Antigonish)*..... .....*Not printed.*

197. Return to an Order of the House of the 19th March, 1913, for a copy of all tenders asking for the construction of a drill hall at Fernie, B.C., of all correspondence concerning the awarding of the contract, and of all correspondence and documents regarding said tender and contract. Presented 14th April, 1913.—*Sir Wilfrid Laurier. Not printed.*

197*a*. Supplementary return to an Order of the House of the 19th March, 1913, for a copy of all tenders asking for the construction of a drill hall at Fernie, B.C., of all correspondence concerning the awarding of the contract, and of all correspondence and documents regarding said tender and contract. Presented 6th June, 1913.—*Sir Wilfrid Laurier*..... ....*Not printed.*

198. Return to an Order of the House of the 24th February, 1913, for a copy of all correspondence and documents between the government of Canada or any officer thereof, and one Miss Mastin, of England, relating to a presentation of certain chinaware and other curiosities, made to the Government by the said Miss Mastin, in memory of the defeat at the polls of the agreement relating to reciprocity with the United States. Presented 14th April, 1913.—*Mr. Sinclair*.....*Not printed.*

199. Return to an Order of the House of the 19th March, 1913, for a return showing the names, professions or occupations, residences, the date of appointment, and the salary in each case, of all correspondents of the *Labour Gazette*, and also the number of changes made in that particular for the year 1912. Presented 22nd April, 1913.—*Mr. Verville* ....*Not printed.*

200. Return to an Order of the House of the 26th March, 1913, for a return showing the amount of seed grain supplied to settlers in Peace River during the year 1912; the amount of seed grain being provided for settlers in Peace River during 1913; who distributed the seed grain supplied in 1912 and who is authorized to distribute seed grain in 1913; under what conditions seed grain was supplied during 1912, and those proposed for 1913; if provisions were supplied during 1912, what the conditions were and who gave out the supplies; if it is intended to supply provisions in 1913, what conditions will be given and who will give them out. Presented 25th April, 1913.—*Mr. Oliver* ....*Not printed.*

201. Return to an Order of the House of the 7th April, 1913, for a copy of all documents in the Department of the Interior prior to the issue of the Crown patents relating to Lot No. 217 of the Hudson Bay Company Survey, in the parish of St. John, Winnipeg. Presented 25th April, 1913.—*Mr. Proulx*.....*Not printed.*

202. Return to an Order of the House of the 31st March, 1913, for a copy of all correspondence claims and reports with reference to compensation claimed by owners of horses attached to the 10th Field Battery at Camp Petawawa in the summer of 1912, by rea-

CONTENTS OF VOLUME 28.—*Continued.*

son of damage or disease contracted while in the service; also of all such claims paid, the amounts in each case, and the persons to whom paid. Presented 25th April, 1913.—*Mr. Carvell*.....*Not printed*

203. Return to an Order of the House of the 11th December, 1912, for a copy of all papers, documents, pay-rolls, accounts, receipts, and correspondence in connection with all expenditures of money made in 1912 upon the Petite Rivière breakwater, Lunenburg County, Nova Scotia. Presented 29th April, 1913.—*Mr. Maclean (Halifax)*.
Not printed.

203a. Return to an Address to His Royal Highness the Governor General of the 9th December, 1912, for a copy of all advertisements, tenders, contracts, orders in council, letters, correspondence, &c., relating to the construction of a wharf or breakwater at Seaforth, Halifax County, N.S. Presented 29th April, 1913.—*Mr. Maclean (Halifax)*.
Not printed.

203b. Return to an Order of the House of the 20th March, 1912, for a copy of all documents, letters, correspondence, petitions, reports, &c., addressed to the Department of Public Works since the 21st September last on the subject of a wharf now under construction at St. Croix, in the County of Lotbinière, province of Quebec. Presented 29th April, 1913.—*Mr. Fortier*.....*Not printed.*

203c. Return to an Order of the House of the 19th March, 1913, for a return showing whether the repairs to Red Point wharf, Lot 48, Prince Edward Island, have been completed; if the work was done by tender or by day labour; if by tender, with whom the contract was made; if by day labour, the number of superintendents, inspectors, or overseers employed, their names, the number of days each did work, and the wages per day paid to each; the number of men employed, their names, the number of days each did work and the wages per day paid to each; who supplied the materials; the amount of each kind or class used, and the price paid for each kind or class; the total amount paid for materials, wages and cost of the work. Presented 2nd May, 1913.—*Mr. Hughes (Kings, P.E.I.)*.....*Not printed.*

203d. Return to an Order of the House of the 31st March, 1913, for a copy of all documents, papers, correspondence, representations, &c., relating to the purchase of land at Digby, Nova Scotia, for the purpose of a site for a public wharf. Presented 2nd May, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

203e. Return to an Order of the House of the 19th March, 1913, for a return showing whether the repairs to Southport wharf, Lot 48, Prince Edward Island, have been completed; if the work was done by tender or by day labour; if by tender, with whom the contract was made; if by day labour, the number of superintendents, inspectors, or overseers employed, their names, the number of days each did work, and wages per day paid to each; the number of men employed, their names, the number of days each did work and the wages per day paid to each; who supplied the materials; the amount of each kind or class used and the price paid for each kind or class; the total amount paid for materials, wages and cost of the work. Presented 2nd May, 1913.—*Mr. Hughes (Kings, P.E.I.)*.....*Not printed.*

203f. Return to an Order of the House of the 11th December, 1912, for a copy of all accounts, correspondence, telegrams, complaints and other documents in possession of the Department of Public Works, in relation to the expenditure of moneys on harbour improvements at Grand Etang, during the year 1911-12. Presented 13th May, 1913.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed.*

CONTENTS OF VOLUME 28.—*Continued.*

203*g*. Return to an Order of the House of the 7th April, 1913, for a copy of all documents, correspondence, &c., relating to the purchase by the Department of Public Works of a certain quantity of timber for the construction of a wharf at St. Germain de Kamouraska, the said purchase having been made, as alleged, from Murray Castonguay during the year 1912. Presented 26th May, 1913.—*Mr. Lapointe (Kamouraska).* *Not printed.*

203*h*. Return to an Order of the House of the 29th January, 1913, for a copy of all letters written to the Honourable Minister of Public Works, or to any officer of the Public Works Department, or to any member of the government since 10th October, 1911, by G. A. R. Rowlings, John S. Wells and S. R. Griffin, relating to the construction of public works, County of Guysborough, N.S., also a copy of the replies to the same. Presented 29th May, 1913.—*Mr. Sinclair*.....*Not printed.*

203*i*. Return to an Order of the House of the 7th May, 1913, for a copy of all correspondence exchanged between the Postmaster General and M. Isidore Belleau, of Quebec, in connection with improvements contemplated in Quebec harbour. Presented 2nd June, 1913.—*Mr. Carvell*..... .....*Not printed.*

203*j*. Return to an Order of the House of the 28th April, 1913, for a copy of all papers, documents, pay-rolls, receipts, accounts, correspondence, &c., relating to repairs made upon the breakwater at Petite Rivière, Lunenburg County, N.S., in the year 1912. Presented 6th June, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

204. Return to an Order of the House of the 4th March, 1912.—1. For a copy of all reports of engineers from 1874 to 1900, relating to the most suitable site in the harbour of Quebec for the construction of a dry dock.

2. Of all correspondence exchanged on the subject of a choice of a site for the dry dock now existing at St. Joseph de Lévis, at the time of its construction.

3. Of engineers reports, plans, maps and bearings relating to the construction of a new dry dock in the port of Quebec since 1900.

4. Of all correspondence exchanged between the different companies and the government relating to the construction of a new dry dock in the port of Quebec, since 1909.

5. Also for the production of all documents submitted by the different companies who have asked for the government grant provided by the Dry Dock Subsidies Act. Presented 29th April, 1913.—*Mr. Béland*.....*Not printed.*

204*a*. Dry dock of Lévis. Report of Mr. Charles Smith against Sampson, et al.—(*Senate*). *Not printed.*

204*b*. Return to an Address to His Royal Highness the Governor General of the 19th March, 1913, for a copy of all orders in council, plans and estimates, correspondence, papers and inquiries respecting the construction of a dry dock at Quebec or Lévis or in the port or harbour of Quebec. Presented 6th June, 1913.—*Mr. Lachance*....*Not printed.*

205. Return to an Order of the House of the 9th April, 1913, for a copy of the petition of the Restigouche Fishermen's Association to the Minister of Marine and Fisheries asking for the removal of Mr. M. M. Mowat, head guardian of the Restigouche Riparian Association as Dominion fishery officer, and the answer thereto. Presented 2nd May, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

206. Return to an Order of the House of the 13th February, 1913, for a return showing the name of the company who has the contract for the electric lighting of the government buildings and grounds in Ottawa, date of contract and period, on what notice can contract be cancelled, price paid per kilowatt hour for electric lighting, names of

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buildings lighted, cost of lighting each per year, rate for electric lighting if a combined power and light rate, price for current for power purposes, if lamps are not free, price paid for the carbon and tungsten lamps renewed, are lamps marked so as to be identified as belonging to the government buildings, number of electric lamp renewals paid for during the last fiscal year, where required, number of carbon and tungsten lamps respectively in use in the several buildings and the candle power or wattage of the same. Presented 2nd May, 1913.—*Mr. Wilson* (*Wentworth*)
Not printed.

207. Return to an Order of the House of the 17th February, 1913, for a copy of all correspondence, letters, telegrams, petitions, memoranda, reports, tenders, deposits, recommendations and all other documents of any nature whatsoever bearing on or having relation to the erection of a public building in the city of Three Rivers, P.Q., since the 11th day of October, 1911, to date. Presented 2nd May, 1913.—*Mr. Bureau.*
Not printed.

207*a*. Return to an Order of the House of the 26th May, 1913, for a copy of all papers, letters, and documents relating to the construction of a public building in the town of Laurentides, County of L'Assomption. Presented 4th June, 1913.—*Mr. Seguin.*
Not printed.

207*b*. Return to an Order of the House of the 2nd April, 1913, for a copy of all correspondence, letters, telegrams, contracts, tenders and reports of government inspector, in relation to the work and repairs on the public building at North Sydney during the year 1912, and particularly the inspector's report on the damages caused by fire during the construction of said works and repairs; and also a copy of the tenders of Henry Lovell, for the above work. Presented 6th June, 1913.—*Mr. McKenzie.*
Not printed.

207*c*. Return to an Order of the House of the 27th January, 1913, for a copy of all telegrams, letters, documents and plans relative to the purchase or acquirement of land for the purpose of erecting a public building in Stellarton, Nova Scotia, in the year 1912. Presented 6th June, 1913.—*Mr. Macdonald*.....*Not printed.*

208. Return to an Order of the House of the 24th February, 1913, for a return showing the names of the buildings occupied by the Government as public offices, which are under rent, excepting the Centre, East, West and Langevin Blocks; the street on which each of these offices is situated and the number of the street in each case. Presented 2nd May, 1913.—*Mr. Boulay*.....*Not printed.*

209. Return to an Order of the House of the 11th December, 1912, for a copy of all accounts, correspondence, telegrams, complaints and other documents in possession of the Department of Public Works, relating to the construction of telegraph lines during the year 1911-12, from South West Margaree to Scotsville, from Scotsville to North Ainslee; from Scotsville to South Lake Ainslee and Whycocomagh; from Little Narrows to Whycocomagh; from Rossville to Big Intervale and from Rossville to the Victoria County Boundary Line, all in the County of Inverness. Presented 2nd May, 1913.—*Mr. Chisholm* (*Inverness*).....*Not printed.*

210. Correspondence in connection with the area or areas prescribed for mange in British Columbia.—(*Senate*).... ....*Not printed.*

211. Report made by the Central Railway of Canada to the Railway Department.—(*Senate*).
Not printed.

CONTENTS OF VOLUME 28.—*Continued.*

212. Return to an Address to His Royal Highness the Governor General of the 10th February, 19.3, for a copy of all orders in council, letters, telegrams and of all other official documents of any kind in the possession of the Department of Customs, relating to the seizures of twenty horses from John Gobel, for smuggling them across the United States boundary near Coutts, or Writing-on-Stone, between the 20th and 28th of February, 1911. Presented 5th May, 1913.—*Mr. MacNutt*.....*Not printed.*

213. Return to an Address to His Royal Highness the Governor General of the 10th February, 1913, for a copy of all orders in council, letters, telegrams and of all other official documents of any kind in the possession of the Department of the Interior, relating to sale of school lands which have been held in the provinces of Alberta and Saskatchewan since the 12th day of October, 1911. Presented 7th May, 1913.—*Mr. McCraney*.....*Not printed.*

213*a*. Return to an Order of the House of the 2nd April, 1913, for a return showing by quarter-section, or fraction of quarter-section, all school lands sold in Manitoba, Saskatchewan and Alberta during the calendar year 1912; the price per acre at which each separate parcel was sold; the name and address of each purchaser; a list of all school lands sold at above sales which have since been cancelled; the price at which each parcel of said cancelled lands were sold, with the names and addresses of purchasers of each parcel of said lands sold and subsequently cancelled. Presented 23rd May, 1913.—*Mr. Turriff*.....*Not printed.*

213*b*. Return to an Order of the House of the 12th February, 1913, for a return showing all school lands sold in the province of Saskatchewan in 1912, giving each parcel of land sold, the name and address of each purchaser, the date and place of sale, the name of the auctioneer at each sale, and any assignments of contracts of purchase of which the government has notice, and a copy of all correspondence passing between the Government, or any member thereof, and the Government of the province of Saskatchewan or any member thereof, with respect to the sale of school lands in the said province. Presented 6th June, 1913.—*Mr. Martin (Regina)*.....*Not printed.*

214. Return to an Order of the House of the 9th April, 1913, for a copy of all petitions, affidavits, specifications, plans, drawings, claims, certificates, papers and patent rights in the Department of Agriculture or the Patents Branch thereof, with respect to Patent Number 142823. Presented 7th May, 1913.—*Mr. Carvell*.....*Not printed.*

215. Return to an Order of the House of the 28th April, 1913, for a copy of all memorials, petitions, and letters, addressed to or sent by the Minister of Agriculture, or on his behalf, in connection with the establishment of an agricultural school, model farm or demonstration station at New Carlisle, Quebec. Presented 9th May, 1913.—*Mr. Marcil (Bonaventure)*.....*Not printed.*

216. Return to an Order of the House of the 28th April, 1913, for a copy of all telegrams, correspondence, returns, &c., between the Department of Agriculture, and any other person or persons, requesting recently that the Veterinary Director General of Canada visit Nova Scotia. Presented 9th May, 1913.—*Mr. Maclean (Halifax)*.

Not printed.

217. Extent to which the Franking privilege is used by the several provinces in Canada for statistics.—(*Senate*).....*Not printed.*

218. Return to an Order of the House of the 29th January, 1913, for a copy of all diaries and other documents relating to and showing the work performed during the months of June and July, 1912, by Homestead Inspectors Rathwell and Erratt in the Moosejaw land district. Presented 16th May, 1913.—*Mr. Knowles*.....*Not printed.*

CONTENTS OF VOLUME 28.—*Continued.*

218*a*. Return to an Order of the House of the 29th January, 1913, for a copy of all diaries relating to and showing the work performed during the months of June and July, 1912, by Homestead Inspectors Brandt, Balfour, Ouelette and Sipes, in the Regina land district. Presented 16th May, 1913.—*Mr. Martin (Regina)*.....*Not printed.*

218*b*. Return to an Order of the House of the 29th January, 1913, for a return showing the expenses of Homestead Inspectors Brandt, Balfour, Ouelette and Sipes during the months of June and July, 1912. Presented 16th May, 1913.—*Mr. Martin (Regina)*. *Not printed.*

218*c*. Return to an Order of the House of the 29th January, 1913, for a return showing the expenses of Homestead Inspector Miller of the Moosejaw land district during the months of June and July, 1912, together with a copy of all reports, proceedings, diaries and other documents, showing the work performed during the said time by the said homestead inspector. Presented 16th May, 1913.—*Mr. Knowles*.....*Not printed.*

218*d*. Return to an Order of the House of the 29th January, 1913, for a copy of all diaries and other documents relating to and showing the work performed during the months of June and July, 1912, by Homestead Inspectors Shields and McLaren, in the Swift Current lands district. Presented 23rd May, 1913.—*Mr. Knowles*.....*Not printed.*

218*e*. Return to an Order of the House of the 29th January, 1913, for a return showing the expenses of Homestead Inspectors Shields, McLaren, Erratt and Rathwell, during the months of June and July of 1912. Presented 26th May, 1913.—*Mr. Knowles.* *Not printed.*

219. Return to an Order of the House of the 26th March, 1913, for a copy of all papers, memoranda, and instructions relating to a certain area of land on the bank of Little Manitou Lake, Saskatchewan, recently transferred to the town of Waterous, for park purposes. Presented 16th May, 1913.—*Mr. Oliver*.....*Not printed.*

220. Return to an Order of the House, of the 4th December, 1912, for a copy of all correspondence and other documents in the possession of the Department of Public Works relating to the proposed interprovincial bridge between Hawkesbury, Ontario, and Grenville, Quebec. Presented 26th May, 1913.—*Mr. Proulx*.....*Not printed.*

221. Return to an Order of the House of the 1st April, 1913, for a copy of all complaints, charges, evidence and reports in connection with the investigation held at Aldershot, N.S., in September, 1912, relating to the alleged thefts of property from the militia camp. Presented 26th May, 1913.—*Mr. Kyte*.....*Not printed.*

221*a*. Return to an Order of the House of the 21st April, 1913, for a copy of all notices, tenders, contracts and correspondence relating to the supplying of ice for the military comp at Aldershot, N.S., for 1913, and of all correspondence relating to the source of such ice supply. Presented 26th May, 1913.—*Mr. Kyte*.....*Not printed.*

222. Return to an Order of the House of the 17th February, 1913, for a copy of all letters, proposals, tenders, memoranda, papers and documents in the possession of the Department of Trade and Commerce, or any department of the Government, bearing date since 1st December, 1912, relating to steamship service between Canada and the West Indies. Presented 27th May, 1913.—*Mr. Maclean (Halifax)*.....*Not printed.*

222*a*. Return to an Order of the House of the 2nd April, 1913, for a copy of all correspondence, petitions, letters, telegrams, and other documents in the Department of Trade and Commerce, or any department of the Government, relating to the SS. service,

CONTENTS OF VOLUME 28.—*Continued.*

between Mulgrave, County of Guysborough and Cheticamp, Inverness County, during the years 1910-11, 1911-12, and 1912-13, and the service to be continued during the year 1913-14. Presented 27th May, 1913.—*Mr. Chisholm (Inverness)*.....*Not printed.*

223. Return to an Order of the Senate calling upon the Clerk of the House to furnish a statement showing the number of Bills passed by the House of Commons since Confederation, which have been:—1. Amended by the Senate. 2. Rejected by the Senate. 3. Amended by the Senate and accepted by the Commons.—*(Senate)*.....*Not printed.*

224. Return to an Order of the House of the 14th May, 1913, showing whether a contract was passed by the Post Office Department in the year 1911, for the use of stamp vending machines, the terms of said contract, the date, and by whom signed. Presented 2nd June, 1913.—*Mr. Lemieux*.....*Not printed.*

225. Ordinances of the Yukon Territory, passed by the Yukon Council in the year 1913. Presented by Hon. Mr. Coderre, 2nd June, 1913.....*Not printed.*

226. Names of judges of Superior and Circuit Court in province of Quebec, date of appointment, &c.—*(Senate)*.....*Not printed.*

227. Return to an Order of the House of the 19th May, 1913, for a return showing the per capita taxation for the year ending 31st March, 1913, and for each of the twelve preceding years. Presented 3rd June, 1913—*Mr. Hughes (Kings, P.E.I.)*....*Not printed.*

228. Return to an Order of the House of the 29th May, 1913, for a return showing whether a certificate has been issued by the Treasury Board authorizing the transfer of the assets and liabilities of La Banque Internationale du Canada to the Home Bank; the terms of the said transfer, and all documents bearing on this question. Presented 3rd June, 1913.—*Mr. Lemieux*.....*Not printed.*

229. Report of the Canadian delegates to the International Conference, held at New York for the consideration of the Commemoration of the First Century of Peace between the United States and the British Empire. Presented by Hon. Mr. Borden, 5th June, 1913.....*Not printed.*

230. Return to an Address to His Royal Highness the Governor General of the 10th March, 1913, for a copy of all correspondence, memoranda, orders in council, departmental orders and reports from fishery overseers or other officers, during the past two years, relating to weir licenses in the waters of the Counties of Charlotte and St. John, Province of New Brunswick. Presented 6th June, 1913.—*Mr. Pugsley*.....*Not printed.*

231. Return to an Order of the House of the 24th February, 1913, for a copy of all letters and papers relating to the issue of half-breed scrip, warrant No. 2155, certificate No. 672, to Albert St. Denis, and the disposition of the said scrip. Presented 6th June, 1913.—*Mr. Oliver*.....*Not printed.*

232. Return to an Address to His Royal Highness the Governor General of the 3rd February, 1913, for a copy of all papers in connection with the withdrawal from settlement of a strip of land one mile in width along the line of the Hudson Bay Railway, and of the order in council, and also of all plans and correspondence in connection with the same, prior and subsequent thereto. Presented 6th June, 1913.—*Mr. Graham.* *Not printed.*

233. A return to an Order of the Senate dated 7th March, 1913, for a copy of all papers, letters, petitions, contracts and other papers relating in any way to the purchase of land at Le Pas for terminus of Hudson Bay road.—*(Senate)*.....*Not printed.*

DEPARTMENT OF AGRICULTURE
CANADA

REPORT

OF THE

VETERINARY DIRECTOR GENERAL

AND

LIVE STOCK COMMISSIONER

J. G. RUTHERFORD, C.M.G.

For the Year ending March 31, 1912

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1912

[No. 15b—1913.]

REPORT OF THE VETERINARY DIRECTOR GENERAL

AND

LIVE STOCK COMMISSIONER.

HEALTH OF ANIMALS AND LIVE STOCK BRANCHES.

OTTAWA, March 31, 1912.

SIR,—I have the honour to present my report as Veterinary Director General and Live Stock Commissioner for the year ending March 31, 1912.

The unsatisfactory conditions referred to in my report of last year as adversely affecting, and to some extent retarding the development of the live stock industry in Canada, still continue, some of them in fact being now more serious than they were a twelve month ago.

There has been during the past year no cessation of activity in the various lines of work conducted under my supervision.

The Health of Animals Branch has continued its efforts to protect the live stock of the country from disease, not only by guarding against its introduction from abroad, but by preventing the spread of infection already existing among Canadian herds and flocks.

While in the summary of the year's work there are not wanting illustrations of the fact that in the warfare against disease, in which this Branch is constantly engaged, 'eternal vigilance is the price of safety,' there are also ample and gratifying evidences that the efforts made in the past have resulted in bringing under reasonable control most of the maladies affecting the live stock of Canada.

While much yet remains to be done before this Branch can be looked upon as either fully organized or properly equipped, I feel that I am justified in saying that the year just past will, in point of progress and achievement, compare very favourably with any of those during which this work has been under my supervision.

The Meat Inspection service has been steadily growing more efficient.

The progress achieved by the Live Stock Branch in the all important work entrusted to its charge has, though still leaving much to be desired, been decidedly more satisfactory than for several years previous.

The fact that the Canadian Live Stock industry is at present passing through a somewhat critical period renders the increased and increasing usefulness of this Branch an even greater source of satisfaction than it would be were the conditions normal. There is, I am convinced, every ground for the belief that with the interest now evinced in its work and the liberal financial support which that work so unquestionably deserves, this comprehensive Branch of your Department will, from this time forward, demonstrate its varied usefulnesses in a much more striking and emphatic manner than has been possible in the past.

Each of the more important phases of the work of these Branches is categorically dealt with in the present report and any further remarks of an introductory character are therefore unnecessary.

HEALTH OF ANIMALS BRANCH.

HOG CHOLERA.

Reference to the accompanying statistics will show that the outbreaks of Hog Cholera dealt with in the last twelve months have been both more numerous and more extensive than those recorded during any like period for some considerable time past. While, at first sight, this may be thought discouraging, a closer scrutiny of the facts connected with these outbreaks will convince the intelligent observer that the situation, though undoubtedly grave, is not nearly as serious as the figures might be taken to indicate. In the first place, it is evident that the disease has now, nowhere in Canada, a permanent and constant habitat, such as it undoubtedly had at one time in the Counties of Essex and Kent in the province of Ontario. Secondly, it will be seen that the strict and systematic enforcement of the present quarantine regulations has been eminently successful in preventing the introduction of direct infection from the United States, where in many different localities, the disease is constantly in evidence, and causes great loss to farmers and others engaged in the hog industry. Our experiences during the past year furnish very strong if still only circumstantial evidence in support of the views advanced in my previous reports, that the great majority of the outbreaks now dealt with by our officers are traceable to the consumption by garbage-fed hogs of uncooked hog products originating in countries where the disease exists.

In support of this contention, I have thought it advisable to publish herewith a special report, furnished at my request by Dr. Moore, Chief Travelling Inspector of the Health of Animals Branch, under date of November 13, 1911. Your attention is also directed to a paper on the subject read during the present month before the Veterinary Association of the province of Manitoba, by Dr. C. D. McGilvray, the officer in control of the work of the Branch in Manitoba, and which will be found in his individual report.

A thoughtful and unprejudiced perusal of these two documents should, I am convinced lead any one with an open mind to the conclusion that the prevalence of the disease in the districts referred to may much more reasonably be attributed to the consumption of infected pork and pork products than to any other possible source.

For several years back I have been anxious to demonstrate the accuracy of this theory by means of a series of carefully conducted feeding experiments. Owing however to lack of proper facilities for the isolation of experimental animals at the Biological Laboratory and the consequent risk of introducing the disease to the valuable herds of swine kept in the vicinity, nothing has, as yet, been done in this connection. I sincerely trust that the furnishing of proper equipment for work of this kind will be no longer delayed and that my successor in office may thus be given an opportunity of testing the soundness of the views now advanced.

In the Dominion 4,249 hogs were destroyed as diseased at a cost of $23,446.51 in compensation.

ONTARIO.

Sixty-four outbreaks of hog cholera occurred in Ontario in which 1,499 hogs, valued at $12,382 were destroyed in the undermentioned districts at a cost of $8,300.54 in compensation.

Nineteen premises were also quarantined on suspicion, involving the control of 1,266 hogs.

Two hogs, valued at $16 were destroyed for purposes of examination, but no evidence of hog cholera was found.

District.	Number of outbreaks.	Hogs destroyed.
Algoma	16	319
Essex	8	112
Kent	10	199
Thunder Bay and Rainy River	29	849
Welland	1	20
Total	64	1,499

MANITOBA.

Sixty-two outbreaks of hog cholera occurred in Manitoba in which 2,218 hogs, valued at $18,538 were destroyed in the undermentioned districts at a cost of $12,358.52 in compensation.

Twelve premises were also quarantined on suspicion, involving the control of 278 hogs.

District.	Number of outbreaks.	Hogs destroyed.
Macdonald	12	130
Provencher	25	579
Selkirk	13	597
Winnipeg	12	912
Total	62	2,218

SASKATCHEWAN.

Three outbreaks of hog cholera occurred in Saskatchewan, in which 158 hogs, valued at $1,461 were destroyed in the undermentioned districts at a cost of $974 in compensation.

Five premises were also quarantined on suspicion, involving the control of 167 hogs.

District.	Number of outbreaks.	Hogs destroyed.
Moosejaw	2	77
Saskatoon	1	81
Total	3	158

ALBERTA.

Sixteen outbreaks of hog cholera occurred in Alberta in which 316 hogs, valued at $2,258.20 were destroyed in the undermentioned districts at a cost of $1,505.45 in compensation.

Eight premises were also quarantined on suspicion, involving the control of 86 hogs.

One hog valued at $15 was destroyed for purposes of examination, at a cost of $10, but no evidence of hog cholera was found.

District.	Number of outbreaks.	Hogs destroyed.
Calgary	10	155
Medicine Hat	6	161
Total	16	316

BRITISH COLUMBIA.

Two outbreaks of hog cholera occurred in British Columbia in which 58 hogs, valued at $513 were destroyed in the undermentioned districts at a cost of $342 in compensation.

Three premises were also quarantined on suspicion, involving the control of 202 hogs.

District.	Number of outbreaks.	Hogs destroyed.
Nanaimo	1	50
Vancouver	1	8
Total	2	58

TUBERCULOSIS.

The attitude of the Department with reference to Bovine Tuberculosis has not undergone any serious change during the year just past. I had hoped that, after the publication in 1910, of the report of the International Commission on Bovine Tuberculosis and the subsequent wide distribution of the special farmers' bulletin relating to the disease, which was also prepared by that body, public opinion would ere this time, have warranted the Department in adopting a definite and comprehensive policy, having for its object the present control and ultimate eradication of the malady.

So far, however, although possibly to some extent, owing to circumstances having only an incidental bearing on the subject, it has not been possible to either officially formulate or put in operation the policy recommended by the Commission, against which, it is encouraging to note, no hostile criticism has been at any time directed.

As the Commission has, for the present, practically concluded its labours, I did not deem it necessary to call any meetings during the year, except on one occasion, when a favourable opportunity having been presented by the holding of the annual convention of the American Veterinary Medical Association in Toronto in August last, the special pamphlet above referred to was, prior to publication, subjected to the careful scrutiny and revision of the members.

At the meeting of the National Live Stock Association which was held in Ottawa in February last, it fell to my lot to address the members on the subject of Bovine Tuberculosis, and it may be noted that among the resolutions passed by that body the following is included:—

Resolved, that in the opinion of this Association, it is eminently desirable that the Dominion Government should, at the earliest possible date, suggest a policy having for its object the control, and as far as possible the eradication of Bovine Tuberculosis, on the lines recommended in the report of the International Commission.

I sincerely trust that in the near future it will be found possible to embody in the effective regulations of the Department the recommendations of the Commission which, as is shown by the resolution quoted above, are generally approved by the leading stock owners of the Dominion. :

440 cattle were tested on being imported into Canada, 14 of which re-acted, 9 were classed as suspicious, and 417 proved healthy.

443 cattle were tested for export, 18 of which reacted, 4 were classed as suspicious, and 421 proved healthy.

2,542 cattle were tested by private practitioners, 269 of which reacted, 35 were classed suspicious, and 2,238 proved healthy.

All reactors were permanently earmarked by a veterinary inspector in cases where the owner did not voluntarily destroy them.

GLANDERS.

The present policy of the Department with regard to Glanders, has, since its adoption in 1904, been attended with most gratifying results in every part of the Dominion. While owing to special conditions which have been repeatedly referred to in my previous annual reports, the success which has attended its operation has been less clearly apparent in Saskatchewan than in any of the other provinces, this circumstance should not be permitted to obscure the very evident fact that, even there, the methods now in use, have been productive of excellent results.

A careful analysis of the figures relative to Glanders in Saskatchewan during the past seven years will I think, satisfy any one interested in the subject and familiar with the previous history of the disease in that province and the adverse conditions there met with by our officers, that the results derived from the enforcement of the present policy are such as more than warrant its continuance.

As a practical and effective means of enabling the veterinary inspector in the field to form an accurate and reliable diagnosis of glanders, the mallein test unquestionably still holds first place, although in making this statement I do not wish to be understood as reflecting in any way, upon the newer and possibly more scientific tests which, from their very delicacy and exactitude, can be used to much better advantage in the research laboratory than in the stable.

In one particular only would I recommend a change in the existing regulations. As a result of the very considerable increase which has taken place in the price of horses since the inauguration of the present policy, the scale of compensation now paid is altogether too low, and should, in the public interest, be raised to an extent reasonably proportionate to the actual value of the animals destroyed.

In this connection it should be borne in mind that if the present policy continues to be carefully and conscientiously enforced, the expenditures for compensation will, as in the past, show a constant and regular decrease, thus eliminating the possibility of any largely augmented outlay on account of this particular disease.

DOMINION.

853	7	killed on inspection.	Valued at $116,160, at a cost $77,439.95.
	774	" at 1st test.	
	66	" at 2nd test.	
	5	" at 3rd test.	
	1	" at 5th test.	

291 showed clinical symptoms.

31,434 horses were tested with mallein of which 846 reacted and were destroyed. Of the 846 reactors, 284 showed clinical symptoms of glanders at or during the test.

514 horses are under control for retest.

Of the above 853 horses slaughtered, 22 were killed without compensation as being diseased when imported into Canada.

PRINCE EDWARD ISLAND.

Three horses were tested and proved to be healthy.

NOVA SCOTIA.

Thirty horses were tested and proved to be healthy.

NEW BRUNSWICK.

7 { 7 killed at 1st test. } Valued at $825, at a cost of $550.

Three showed clinical symptoms.

On hundred and fifty-three horses were tested with mallein, of which 7 reacted and were destroyed. Of the 7 reactors, 3 showed clinical symptoms of glanders at or during the test.

Eight horses are under control for retest.

The 7 horses slaughetred were in the electoral district of Sunbury and Queens.

QUEBEC.

19 { 3 killed on inspection. } Valued at $2,450.
{ 16 " at 1st test. } At a cost of $1,633.33.

Eleven showed clinical symptoms.

Three hundred and eighty-three horses were tested with mallein, of which 16 reacted and were destroyed. Of the 16 reactors, 8 showed clinical sypmtoms of glanders at or during the test.

Seven horses are under control for retest.

Of the 19 horses slaughtered—

19 {
5 were in the electoral district of Joliette.
2 " " Berthier.
3 " " Labelle.
1 was " " Yamaska.
1 " " " Drummond and Arthabaska.
6 were " " Portneuf.
1 was " " Hochelaga.

ONTARIO.

4 { 4 killed at 1st test. } Valued at $600.
{ At a cost of $400.

Four showed clinical symptoms.

One thousand and nine horses were tested with mallein, of which 4 reacted and were destroyed. Of the 4 reactors, all showed clinical symptoms of glanders at or during the test.

Twenty horses are under control for retest.

The 4 horses slaughtered were in the electoral district of Nipissing.

MANITOBA.

38 { 1 killed on inspection. / 35 " at 1st test. / 2 " at 2nd test. } Valued at $5,085. At a cost of $3,389.98.

Ten showed clinical symptoms.

Five thousand and fifty-six horses were tested with mallein, of which 37 reacted and were destroyed. Of the 37 reactors 9 showed clinical symptoms of glanders at or during the test.

Fifty-five horses are under control for retest.

Of the 38 horses slaughtered—

38 { 5 were in the electoral district of Macdonald. / 1 was " " Portage la Prairie. / 32 were " " Souris.

SASKATCHEWAN.

722 { 2 killed on inspection. / 661 " at 1st test. / 54 " at 2nd test. / 5 " at 3rd test. } Valued at $98,615. At a cost of $65,743.33.

Two hundred and forty-two showed clinical symptoms.

Eighteen thousand three hundred and fifty-three horses were tested with mallein, of which 720 reacted and were destroyed. Of the 720 reactors, 240 showed clinical symptoms of glanders at or during the test.

Three hundred and sixty-three horses are under control for retest.

Of the 722 horses slaughtered—

722 { 63 were in the electoral district of Regina. / 47 " " Humboldt. / 3 " " Qu'Appelle. / 8 " " Mackenzie. / 77 " " Saskatoon. / 170 " " Battleford. / 44 " " Assiniboia. / 282 " " Moosejaw. / 22 " " Prince Albert. / 6 " " Saltcoats.

ALBERTA.

50 { 40 killed at 1st test. / 9 " at 2nd test. / 1 " at 5th test. } Valued at $6.950. At a cost of $4,633.31.

Seventeen showed clinical symptoms.

Three thousand nine hundred and forty-three horses were tested with mallein, of which 50 reacted and were destroyed. Of the 50 reactors, 17 showed clinical symptoms of glanders at or during the test.

Seven horses are under control for retest.

Of the 50 horses slaughtered—

50 { 12 were in the electoral district of Red Deer. / 3 " " Strathcona. / 11 " " Medicine Hat. / 12 " " Macleod. / 12 " " Edmonton.

BRITISH COLUMBIA.

6 { 1 killed on inspection. / 5 " at 1st test. } Valued at $810. At a cost of $540.

Three showed clinical symptoms.

Two thousand one hundred and eighty-three horses were tested with mallein, of which 5 reacted and were destroyed. Of the 5 reactors, 2 showed clinical symptoms of glanders at or during the test.

Fifty-four are under control for retest.

Of the 6 horses slaughtered—

6 { 1 was in the electoral district of Kootenay. / 4 were " " Victoria. / 1 was " " Nanaimo.

UNORGANIZED TERRITORIES.

7 { 6 killed at 1st test. / 1 " at 2nd test. } Valued at $525. At a cost of $550.

Thirty-three horses were tested with mallein, of which 7 reacted and were destroyed. Of the 7 reactors, one showed clinical symptoms of glanders at or during the test. All the horses were slaughtered at Le Pas, N.W.T.

MALADIE DU COIT OR DOURINE.

Maladie du Coït or Dourine still continues to exist to a limited extent in Southern Alberta where its presence was first detected in 1904.

As will be seen from the statistics the number of animals destroyed during the period covered by this report as being affected with the disease, is very considerably less than in any previous year since it made its appearance in Canada. It should be noted also that in the case of five (5) of the twelve (12) horses destroyed this year, the infection was derived from a stallion imported direct from the State of Iowa to South Eastern Saskatchewan. In the western part of the last named province, close to the boundary of Alberta, several animals suspected of being affected, are at present held under quarantine, but in this case it is probable that the disease, if it is found to exist, has been introduced from the old infected area which had Lethbridge as its centre.

The valuable research and experimental work which has for a number of years been carried on by Dr. Watson, the Pathologist in charge of the Branch Laboratory near Lethbridge, has brought to light many important facts, both practical and scientific, relative to the disease as it exists in America. Dr. Watson has during the past year had the advantage of spending several months in studying Maladie du Coït under the direction of some of the most noted pathologists of Europe and there is every reason to hope that with the additional knowledge thus acquired, it will, in the comparatively near future, be possible to completely eradicate this loathsome and insidious malady.

SESSIONAL PAPER No. 15b

COMPARATIVE STATEMENT Regarding Maladie du Coït since its detection in Canada in 1904.

Year.	Number of horses destroyed.	Value.	Compensation paid.
		$ cts.	$ cts.
1904-05	292	24,045 00	16,029 94
1905-06 (5 months)	120	10,210 00	6,806 48
1906-07	167	15,505 00	10,336 44
1907-08	49	5,175 00	3,449 92
1908-09	28	3,760 00	2,506 54
1909-10	37	5,130 00	3,419 98
1910-11	40	4,960 00	3,306 60
1911-12	18	2,610 00	1,739 99

Eighteen animals valued at $2,610 were slaughtered as being affected with this disease at a cost of $1,739.99, distributed as follows:—

District.	Suspected and Quarantined.	Slaughtered.
Manitoba—		
Souris	3	
Saskatchewan—		
Battleford	84	
Qu'Appelle	32	5
Regina	21	
Alberta—		
Calgary	18	
Macleod	83	10
Medicine Hat	5	3
Red Deer	6	
	252	18

Value, $2,610. Compensation, $1,739.99.

MANGE IN CATTLE.

Isolated outbreaks of mange continue to occur in the area in Southern Alberta and Southwestern Saskatchewan which has for a number of years been quarantined on account of the existence of this disease. The areas in which the disease actually exists are, however, being constantly reduced in size, while the number of animals affected shows a gratifying diminution. In view of the difficulties encountered in dealing with the disease among animals kept under range conditions, the progress made may be regarded as reasonably satisfactory, although even better results might be secured were it possible to obtain, to a greater extent than at present, the co-operation and assistance of the stock-owning public.

The latest reports indicate that the outbreak of mange which recently occurred in the vicinity of Kamloops, B.C., and which was directly traceable to infection introduced from Alberta, is well under control and not likely to prove serious, although there also the attitude of many stock owners leaves much to be desired.

CATTLE MANGE.

Province.	Outbreaks.	Animals affected.	Animals quarantined.
Nova Scotia	10	30	93
Ontario	1	.....	65
Saskatchewan	79	297	16,608
Alberta	441	3,301	116,690
British Columbia	32	155	3,294
	583	3,783	136,750

46,576 cattle were inspected on being presented for shipment from the quarantined areas in Saskatchewan, Alberta, and British Columbia.

99,698 cattle were inspected in Winnipeg on arrival from points west thereof.

HORSE MANGE.

Province.	Outbreaks.	Animals affected.	Animals quarantined.
Quebec	32	46	98
Ontario	1	.....	1
Manitoba	17	40	76
Saskatchewan	68	92	431
Alberta	36	78	477
	154	256	1,083

12,123 horses and 78 mules were inspected on being presented for shipment from the quarantined area in Alberta and Saskatchewan.

ANTHRAX.

The history of Anthrax during the year just past is such as to lend additional force to the opinions expressed in previous reports as to the good effects which appear to be following the policy of preventive inoculation with Anthrax Vaccine.

The disease, however, made its appearance among sheep in the vicinity of Lethbridge, Alberta, during the year, a fact which indicates the necessity for careful supervision of the flocks and herds in that vicinity.

The following outbreaks were reported and dealt with during the year:—

Province.	Outbreaks.	Animals quarantined.
Quebec	11	275
Ontario	3	46
Saskatchewan	4	426
	18	748

In Quebec, 1 outbreak was in the Jacques Cartier district, 1 in the Sherbrooke district and 9 in the Richmond and Wolfe district.

In Ontario, outbreaks were dealt with in the districts of Perth, Glengarry and Bruce respectively.

In Saskatchewan, 3 outbreaks were in the Assiniboia district and 1 in the Moose-jaw district.

One thousand three hundred and fifty six doses of Anthrax vaccine were sent out by the Biological Laboratory of the Branch.

BLACK QUARTER.

Outbreaks of this disease, which was for many years erroneously believed to be a form of Anthrax, are not dealt with under the Animal Contagious Diseases Act. The practice of preventive inoculation with the black quarter vaccine manufactured in the Biological Laboratory of this Branch, is now very generally followed by stock owners, this vaccine being in constantly increasing demand in the districts where the disease is known to exist.

Nine thousand five hundred and ten doses of Black Quarter vaccine were supplied to owners from the Biological Laboratory during the past year.

SHEEP SCAB.

As will be seen from the statistics, this disease has been practically eliminated from those portions of the Dominion in which outbreaks have been detected during recent years. A few cases were dealt with during the past season in the province of Quebec, but were of an exceedingly mild variety yielding readily to treatment. Canada is, to all appearances entirely free from the infection of Sheep Scab, but in view of the large importations of sheep now constantly being made, and the ease with which, as is shown by our past experience, it can be reintroduced from the United States, it is advisable to take every possible precaution against such a contingency. With this end in view the existing regulations have been strengthened both by careful revision and by the passing of a special Ministerial Order, copies of which, with the amended regulations are published as an appendix hereto.

In Quebec 41 animals on two premises were found to be affected with sheep scab, involving the quarantine of 286 sheep on 20 premises, distributed as follows:—

District.	Affected.	Quarantined.
Maskinonge	40	227
Yamaska	1	59
	41	286

In Manitoba 215 sheep on 1 premises were quarantined, as suspected of being affected with sheep scab. These were subsequently found to be healthy and were released.

In accordance with the Quarantine Regulations 12,593 sheep imported into Canada were quarantined for the prescribed period of thirty days

RABIES.

A number of outbreaks of Rabies have taken place in various centres within the area in Western Ontario formerly quarantined on account of this disease. All

cases reported have been promptly and effectively dealt with by the officers of the Branch, who acting under instructions have, wherever possible, endeavoured to secure the co-operation and assistance of the municipal authorities, this being as a rule, readily given.

The public are now very much better informed as to the nature of the disease than at the time when it first made its appearance in the province some five years ago. There is now, as a consequence, not only much greater caution in dealing with animals showing symptoms suggestive of Rabies, but a very general tendency to promptly report all such cases to the proper authorities and to carefully follow official orders and instructions.

One gratifying result of the recent outbreaks of Rabies, is the marked diminution of the number of useless curs which formerly infested the towns and villages of Western Ontario, although there is still room for considerable further improvement in this regard.

One hundred and twenty-three premises were quarantined on account of the prevalence of Rabies in the adjacent districts, distributed as follows:—

ONTARIO.

District.	Premises Quarantined.
Brantford	8
Dufferin	8
Elgin	6
Halton	3
Huron	1
Lambton	4
Middlesex	2
Oxford	2
Peel	2
Simcoe	16
Toronto	28
Waterloo	3
Welland	1
Wellington	9
York	30
	123

EPIZOOTIC ABORTION.

Outbreaks of Epizootic Abortion have, during recent years, been reported to the Department with constantly increasing frequency. The natural deduction from this state of affairs, namely that the disease is becoming more prevalent, is however, scarcely warranted by the facts. From the time when herds of any size began to be maintained in Canada, Epizootic Abortion has been responsible for very serious losses, especially to owners of cattle. Owing however, to the fact that in herds in which changes are comparatively few and infrequent, the disease has a tendency to disappear in the second or third year as the result of acquired immunity, owners have until lately been inclined to regard it either as a mysterious visitation of Providence, against which ordinary safeguards were useless, or as a malady which would yield easily to almost any kind of empirical treatment

It was not until the researches of Bang and Nocard, in the closing years of the last century, brought to light the fact that Epizootic Abortion was caused by a specific germ, that the public became alive to the possibility of combatting its ravages by modern scientific methods.

The subject was widely discussed from the new point of view and much attention was given to it by agricultural and professional publications. Under these circumstances it was but a short time until the more intelligent stock owners began to inquire as to the possibility of bringing the disease under legislative control, with the view of preventing the spread of infection and the introduction of affected animals to sound herds. Owing, however, to its highly insidious character, the consequent difficulty of diagnosis and the unquestionable fact that although our knowledge of the disease was greatly in advance of what it had previously been, it was still, on many important points lamentably defective, the obstacles in the way of formulating an intelligent policy for its control were almost everywhere considered too serious to warrant governmental action.

Full credit should be accorded to the many veterinary scientists who, in various countries, have devoted their time and attention to the further study of this disease. It is however, I think, beyond question that the best results have been attained from the work of Mr. Stewart Stockman, F.R.C.V.S., Principal Veterinary Surgeon to the Board of Agriculture of Great Britain, who acting under the authority of a special committee appointed in 1905, has since that time been engaged in an exhaustive study of the whole question. His first report on the subject, published in 1909, is of so interesting and valuable a nature, that I have deemed it advisable to reprint it as an appendix hereto.

I have also, as you are aware, recommended that Dr. Fred. Torrance of Winnipeg, whose scientific as well as practical qualifications render him eminently well fitted for the task, should be delegated to proceed to England for the purpose of making, at first hand, a full and searching inquiry as to the methods adopted by Mr. Stockman, and the results so far obtained.

I am satisfied that, if you see fit to adopt this suggestion, the report which Dr. Torrance should be able to furnish, will be invaluable to you in formulating an effective policy for the control of this troublesome and wasteful epizootic disease.

RED WATER.

The investigation into the nature and cause of the disease known as 'Red Water,' which for many years back has occasioned more or less loss to cattle owners in certain districts in British Columbia, is still in progress. This work is in charge of Dr. Seymour Hadwen, who has enjoyed exceptional opportunities for familiarizing himself with the subject, and who has, for some years, been making a careful study of the disease in the different districts in which it exists. His report is printed as an appendix hereto. He has now been stationed at Agassiz, B.C., in charge of a Branch Laboratory specially equipped for the carrying on of such research and experimental work as is likely to assist in the elucidation of the information still required to enable the Department to formulate a definite policy for the eradication of the disease.

BIOLOGICAL LABORATORY.

The work carried on at the Biological Laboratory at Ottawa which is under the personal supervision of Dr. C. H. Higgins, Pathologist of the Branch, is of necessity somewhat different in character from that at the Branch Laboratories at Lethbridge, Alta., and Agassiz, B.C. The latter consists almost entirely of scientific research and experimental investigation, while that at Ottawa, comprising as it does the manu-

facture of the various diagnostic and prophylactic agents now so largely used in the work of the Branch, is more a matter of routine.

The value of this work, in itself, can however, scarcely be overestimated, while the Laboratory is also of great importance as a training school for the young comparative pathologists, whose services are in constantly increasing demand.

This last mentioned phase of the work has been consistently kept in view ever since the first establishment of the Biological Laboratory shortly after my accession to office. It goes without saying that, in the solution of the pathological problems involved in the intelligent dealing with animal plagues, the services of the specially trained veterinary pathologist are every whit as essential as are those of the human pathologist in his own special line. It is the universal experience of the practical sanitarian whether medical or veterinary, that he can hope to collaborate successfully only with the pathologist whose attention and energies have been devoted to the special study of the diseases with which he, himself, is called upon to deal.

QUARANTINE STATIONS.

The erection of new buildings at Vancouver, White Rock and Keremeos, B.C., has been arranged for, while some slight alteration and additions have also been made to the facilities existing at the port of St. John, N.B. Beyond the necessary repairs to existing stations and the leasing of sites at several points, with a view to future construction, no additions have been made to the quarantine stations listed in my last report.

It is a matter of great regret to me that although I have for many years consistently recommended the making of such arrangements as would place the large and important quarantine station at Pt. Lévis, Que., on a sound and effective footing, no definite action has, as yet, been taken in this regard.

IMPORT TESTING.

15,005 horses were tested on arrival from the United States and allowed to proceed to their destinations.

Entered at.	Number.
Charlottetown, P.E.I.	2
Halifax, N.S.	10
Yarmouth	9
Digby	2
St. John, N.B.	2
Woodstock	5
Florenceville	15
Debec Junction	5
Grand Falls	14
Aroostook Junction	46
St. Stephen	15
McAdam Junction	22
St. Leonards	8
Edmunston	5
Sherbrooke, Que.	23
St. Armand	19

Entered at	Number.
Athelstan	22
Beebe Junction	19
Beauceville	37
Abercorn	14
St. Johns	8
Lacolle Junction	21
Highwater	19
Comins Mills	6
Megantic	17
Coaticook	8
Noyan Junction	13
Montreal	3
Dundee	1
Prescott, Ont	40
Bridgeburg	122
Sarnia	44
Morrisburg	6
Windsor	223
Sault Ste. Marie	29
Rainy River	26
Fort Frances	343
Toronto	15
Cornwall	10
Niagara Falls	54
Kingston	11
Cobourg	2
Brockville	4
Lacolle	2
Port Arthur	1
Emerson, Man	3,264
Snowflake	166
Gretna	733
Bannerman	180
Big Muddy, Sask	267
Marienthal	649
North Portal	2,701
Willow Creek	870
Wood Mountain	776
Regina	2
Coutts, Alberta	1,008
Pendant d'Oreille	109
Twin Lakes	709
Frank	4
Myncaster, B.C.	26
Bridesville	85
Gateway	157
Osoyoos	259
Vancouver	68
Victoria	118
Grand Forks	128
Midway	111
Keremeos	117

Entered at	Number.
New Westminster	3
Rykerts	86
Nelson	64
White Rock	190
Huntingdon	230
Kingsgate	557
Rossland	46

IMPORT Inspections from United States and Newfoundland.

Port.	Horses.	Mules.	Cattle.	Sheep.	Swine	Goats.	Reindeer.	Asses.	Camels.
Charlottetown	2								
Halifax	14	1							
Sydney	76								
Yarmouth	16		1						
St. John	14								
St. Stephen	43	1							
McAdam Junction	28		24	1					
Debec Junction	5								
Woodstock	11		3						
Florenceville	15								
Aroostock Junction	64	2	32						
Grand Falls	14		4						
St. Leonards	8								
Edmundston	5		1						
Quebec							46		
Comins Mills	9		1						
Lake Megantic	17								
Coaticooke	8								
Beebe Junction	49		1	3					
Sherbrooke	66		3	4					
Highwater	100	1	15						
Abercorn	18		1						
St. Armand	526	5	9			2			
Lacolle Junction	237	3	17			1			
Noyan Junction	64	1	4			1			
St. Johns	2	1			1				
Montreal								2	
Athelstan	91		23						
Dundee	29		119						
St. Agnes de Dundee	4		4						
Beauceville	37								
Quebec General	1								
Cornwall	22		1						
Prescott	222		24	3					
Morrisburg	11		2						
Brockville	8		16						
Kingston	23		2						
Cobourg	8	1							
Toronto	66								
a Niagara Falls	885	22	134	32	1	6			23
Bridgeburg	797	7	75	13,470	9				
Windsor	550	8	88	26	16	3			
b Sarnia	191	2	67	8,550	2				
Sault Ste. Marie	70		6			3			
Port Arthur	91	41							
Rainy River	26		10						
Fort Frances	673	71	20	4		1			
Ontario General	52								
Emerson	11,626	1,371	1,960	15,271	57	4		1	
Gretna	2,160	436	425	228	1				
Snowflake	178	8	61						
Bannerman	499	11	104	1	1	1			
Manitoba General			2						
North Portal	13,976	1,166	5,377	231	17	8		6	
Marienthal	846	21	250	1					
Wood Mountain	1,118	24	2	21,444		8			
Big Muddy	880	12	59	1					
Willow Creek	1,344	64	26	12,700				1	
Pendant D'Oreille	497	1	5	12,174					
Coutts	2,981	118	40	32,870	7	48			
Twin Lakes	1,249	2		810					
Alberta General	44	2	3						
	42,666	3,403	9,920	117,826	112	86	46	10	23

a—3 yak. *b*—3 elk.

IMPORT Inspections from United States and Newfoundland.

Port.	Horses.	Mules.	Cattle.	Sheep.	Swine	Goats	Reindeer.	Asses.	Camels.
a Gateway	250	26	9						
b Kingsgate	2,754	96	166	8					
Nelson	106	1	21	1,144					
Rykerts	92	2	5						
Rossland	49		251	904					
Grand Forks	125	2	45	1		1			
Midway	111	2	20						
Myncaster	21	7	10	630					
Bridesville	85		43						
Keremeos	145	4	4	147		50			
Osoyoos	305	9	23	903					
Huntingdon	772	15	89	4,420	14	529			
New Westminster	3			1,794					
White Rock	820	102	32	27,892	3	512		1	
Vancouver	837	45	2	32,250	1	2			
Victoria	810	13	2	4,692					
B. C. General	456	3	10						
White Horse	120	17	492						
Total	50,527	3,747	10,244	192,611	130	1,180	46	11	23

3 yak, 10 elk, 22 buffaloes.
a 15 Buffaloes. *b* 7 Buffaloes, 7 elk.

IMPORT Inspections from Europe.

Port.	Horses.	Cattle.	Sheep.	Ass.	Deer.
Halifax, N.S.	14				
St. John, N.B	579	98	2		
Quebec, Que	27	144	371		
Sherbrooke, Que	13				
Montreal, Que	1,728			1	1
Bridgeburg, Ont.	31	113			
Total	2,392	355	373	1	1

PURE BRED Imports for the year ending March 31, 1912.

SHEEP.

Breed.	Great Britain.	United States.	Total.
Leicester	13		13
Shropshire	85	6	91
Hampshire	201	1	202
Oxford	48		48
Shetland	2		2
Southdown	11		11
Dorset	13		13
	373	7	380

GOATS FROM THE UNITED STATES.

Angora	4

SWINE FROM THE UNITED STATES.

Hampshire	1
Yorkshire	3
Chester White	11
Berkshire	8
Duroc Jersey	14
Poland China	11
Total	48

PURE BRED Imports for the year ending March 31, 1912.

HORSES AND ASSES.

Breed	Great Britain.	United States.	Elsewhere.	Total.
Standardbred	16	99		115
Clydesdale	1,455	26		1,481
Shire	127	6		133
Hackney	62	1		63
Suffolk	45	1		46
Percheron	64	150	152	366
Russian	44			44
Belgian	25	14	59	98
Thoroughbred	4	19		23
Polo Pony	15			15
Pony	106		2	108
Shetland	33	1		34
Welsh Pony	53			53
French Coach		1		1
Jackass		1		1
Trottingbred		35		35
	2,049	354	213	2,616

CATTLE.

Breed.	Great Britain.	United States.	Total.
Ayrshire	205	1	206
Angus	17	2	19
Shorthorn	20	7	27
Jersey	113	66	179
Guernsey		2	2
Holstein		113	113
Hereford		6	6
Durham		8	8
Red Polled		45	45
	355	250	605

DISEASED IMPORTS, 1911-12.

Port.	Number of Horses in Infected Shipments.	Number of Shipments.	Number Horses Diseased.	Country of Origin.	Action.
Halifax, N.S.	1	1	1	U.S.	Destroyed.
Yarmouth	1	1	1	"	Returned.
St. Stephens, N.B.	12	1	4	"	"
Aroostook Junction	6	2	3	"	"
Cornwall, Ont	7	2	2	"	"
Fort Frances	8	1	3	"	"
Emerson, Man	23	4	4	"	3 returned, 1 destroyed.
Gretna	5	2	2	"	1 destroyed, 1 returned.
Bannerman	17	5	7	"	Returned.
North Portal, Sask.	790	139	200	"	196 returned, 4 destroyed.
Marienthal	24	6	9	"	Returned.
Wood Mountain	33	6	6	"	5 returned, 1 destroyed
Big Muddy	33	6	9	"	9 returned ; 1 suspicious destroyed.
Willow Creek	96	6	12	"	9 returned, 3 destroyed.
Pendant d'Oreille	4	1	1	"	Returned.
Twin Lakes	6	1	1	"	"
Gateway, B.C.	16	2	2	"	"
Rykerts	2	1	1	"	"
Rossland	2	1	1	"	"
Grand Forks	3	1	1	"	"
Midway	6	2	2	"	"
Keremeos	20	3	4	"	"
Osoyoos	10	3	3	"	"
Huntingdon	9	2	3	"	"
White Rock	50	5	6	"	"
	1,184	195	288		

Four cows were refused admission from the United States at North Portal, Sask., and two at Nelson being affected with tuberculosis. One horse was also refused admission at North Portal, being affected with mange.

ANIMALS Inspected for Export April 1, 1911, March 31, 1912.

—	Horses.	Mules.	Cattle.	Sheep.	Swine.
St. John to Great Britain	23		3,375	1,798	
Charlottetown to Great Britain			21	76	
Quebec to Great Britain			588		
Montreal " "	118		45,037	3,484	
Toronto " "			9,991		
Niagara Falls to Great Britain			144		
Inspected at Montreal for shipment to Great Britain via Boston and Portland			14,110		
St. John to South Africa		375			5
Montreal " "	10	367	92	241	
Halifax to Bermuda	62		38	77	46
" St. Pierre and Miquelon			14	10	4
" Newfoundland	36		5	13	181
" Jamaica			15		
" St. Vincent				14	
" Demerara	5				
" St. Kitts	1				
" Monserrat				2	2
" Antiqua	8				
" Barbadoes	21		2		
" Trinidad	5				
Sydney to St. Pierre and Miquelon	1		51	384	
" Bermuda	1				
Toronto to "			45	280	
Montreal to France			364		
Toronto to Antwerp			1,140		
" Brazil			60		
Charlottetown to Newfoundland	30		1,248	1,214	432
Summerside "			310	276	
Bayfield "	19		215	44	
Mulgrave "	31		643	788	
Sydney "	427		1,087	523	116
Montreal "			9	90	
Charlottetown to United States	1			6	
Toronto to United States				418	
Niagara Falls to United States			15		
Bridgeburg to United States				319	12
Total	799	742	78,619	10,057	798

EXPORT ANIMALS Rejected at the following ports from April 1, 1911, to March 31, 1912.

—	Cattle.	Sheep.
St. John, N.B	5	1
Montreal, Que	177	5
Toronto, Ont	53	
	235	6

Of the above 58 cattle at Montreal, and 38 at Toronto were rejected for actinomycosis. The rest of the animals were suffering from lameness or injuries received during transportation and showed no indication of contagious or infectious disease.

STAFF.

The following changes have taken place in the personnel and disposition of the staff during the year:—

In the Contagious Diseases Division of the Health of Animals Branch the following additions were made to the staff of Veterinary Inspectors:—

A. E. Alexander, V.S.
J. P. Aikenhead, V.S.
F. Braund, V.S.
A. C. Blackwood, V.S.
G. C. Cockerton, V.S.
H. B. Coleburn, V.S.
J. Dickenson, V.S.
H. H. S. George, V.S.
W. L. Hawke, V.S.
O. Hall, V.S.
R. D. MacIntosh, V.S.
W. G. Moore, V.S.
E. A. Meakings, V.S., (re-engaged).
H. S. Manhard, V.S.

A number of additions to the Field Inspection Staff were also made by the transfer of Inspectors from the Meat Inspection Division.

The services of some few officers were dispensed with for various reasons, and the resignations of several others accepted, among these latter, I regret to state being Car Inspector Jas. W. Robb and Veterinary Inspector W. T. Patton.

Three new car inspectors were added to the strength, namely Mr. A. Sparrow, (who assumed the duties formerly performed by Mr. Robb), and Messrs. R. Blackwood, W. H. Shaver and C. W. Young.

Speaking generally but few changes were made in the locations of the various officers, except in such cases as this was rendered necessary by the exigencies of the service.

Some additions were made to the clerical staff during the year, and the Meat Inspection Division lost one officer by death in the person of E. E. Irvin, B.V.Sc.

In the Meat Inspection Division, several resignations were also accepted, while the following veterinary and lay inspectors were added to the staff:—

Veterinary Inspectors.	Lay Inspectors.	Canning Inspectors.
R. D. Boast, B.V.Sc.	T. Babe, V.S.	A. Bowlby.
S. G. Bright, B.V.Sc.	H. Beaudoin.	W. Graham.
C. S. Cain, V.S.	R. Benoit.	
H. Colebourn, V.S.	W. J. Blainey.	
R. H. Cook, V.S.	W. A. Hilliard, V.S.	
E. E. Irvin, B.V.Sc.	Wm. Howard.	
S. Jacques, B.V.Sc.	E. Hunter.	
H. C. Leslie, V.S.	P. J. Kelly.	
M. H. Milton, B.V.Sc.	Paul Kingston.	
G. H. Paquette, B.V.Sc.	R. H. Lyon.	
A. C. Tanner, B.V.Sc.	D. McDonald.	
R. G. Tupling, B.C.Sc.	D. Rivet.	
C. H. Weaver, B.V.Sc.	J. R. Songhurst.	

In the Live Stock Branch Mr. R. S. Hamer, B.S.A., was engaged in November last to act as assistant to the Assistant Live Stock Commissioner, while a poultry expert in the person of Mr. W. A. Brown, B.S.A., was added to the staff in September.

Owing to the constantly increasing interest taken by breeders in the Canadian Record of Performance for Dairy Cattle and the consequent volume of inspection work necessary in this connection, it has been found necessary to appoint a number of new inspectors for this work during the year. Messrs. E. M. Chalcraft, W. H. Irvine, J. Sedgewick, J. M. Scott, C. S. Wood, H. J. Ingalls, and A. S. Morrison were accordingly engaged, the two last named having since resigned together with Messrs. G. W. Clemons and W. H. McNish, two of the inspectors previously engaged in this work.

Owing to the increasing pressure of official duties and the peculiar circumstances which, during the past year, have affected their performance, it has been necessary for me to remain almost constantly in Ottawa, although doing so involved absence from many important gatherings which otherwise I would have been able to attend. Among the more important of these might be mentioned the meeting of the Permanent Commission on International Veterinary Congresses, of which I am a member, and which was convened in June last at Baden-Baden. I was also unfortunately prevented by illness from attending the inaugural meeting of the Canadian Public Health Association, although I have since been appointed the Convenor of the Animal Foods Section of that organization.

In my capacity as Chairman of the International Commission on the Control of Bovine Tuberculosis, I attended a meeting of that body held in August last at Toronto during the Convention of the American Veterinary Medical Association.

In January last the business relations between the drovers and commission men doing business in Toronto, and the packers and other buyers of cattle on the markets of that city, underwent a somewhat serious interruption. It was claimed by the packers that as a consequence of the losses due to the condemnations resulting from the enforcement of the Meat and Canned Foods Act, it was necessary for them to inaugurate a system of dockage in the case of all cattle purchased either on the Western Cattle Market or at the National Stock Yards, the scale which they desired to establish being at the rate of 20 cents per head for all animals sold at over three and one half cents per pound, and 50 cents per head for all animals sold at a less figure. To this proposition the drovers and commission men dissented so vigorously that for nearly a fortnight, business was practically at a standstill. At your request, I proceeded to Toronto, where in collaboration with Mr. W. F. MacLean, M.P., I succeeded in bringing about a compromise and restored friendly relations.

STOCK YARDS AND CARS.

I am pleased to be able to report that a marked improvement has been brought about in the various live stock markets, as well as in the railway and other stock yards, and stables used for the public accommodation of animals either in transit or offered for sale, by the comprehensive system evolved and placed in operation by this Branch, whereby this particular class of work is entrusted to a number of special inspectors whose duty it is to keep a close watch on all establishments of the kind mentioned above and to see that the provisions of the Act and the regulations are duly enforced. A similar advance has been made with reference to all cars used for the conveyance of live stock, which, by arrangement with the railway companies concerned, are thoroughly cleansed and disinfected under the supervision of special inspectors at many of the principal divisional points.

The railways though at first inclined to minimize the importance of this work, have during recent years co-operated with the Branch in a very friendly and gratifying manner, and the improved conditions are greatly appreciated by the stock owning public, especially those persons who find it necessary to ship stock by rail. Safety from disease infection is of course the principal object in view, while the additional comfort and reduced suffering of the animals are not to be disregarded.

A set of regulations governing generally the transportation of live stock and setting forth the conditions under which shipments of this class are to be dealt with, are now under consideration by the Board of Railway Commissioners, and their promulgation, while simplifying and rendering largely more effective the work now being done by the officers of this Branch, will at the same time undoubtedly prove of great value to the live stock interests of the country.

MEAT INSPECTION.

The work in this division has, during the past year been still further organized and developed.

The number of Veterinary Inspectors now employed under the Meat and Canned Foods Act is 85, while the lay inspectors number 21.

No specially serious difficulties have, during the year, been encountered in the enforcement of the Meat and Canned Foods Act. It is a matter of regret that it has not yet been found possible to bring about the changes in policy with regard to the admission of foreign meats which have, for so long, been strongly advocated by the packers.

The vexed question of the disadvantages to which establishments operated under the Act are subjected in the matter of interprovincial trade, is still under discussion, although its adjustment on sane and reasonable lines is of infinitely more importance to the public health, than it is to the pockets of the legitimate packers who are at present the chief financial sufferers from the unfair legal discrimination which, under present conditions undoubtedly exists.

The sentiment in favour of municipal abattoirs, in which meats intended for domestic consumption would be submitted to expert examination, in the same manner as is now done, under the Meat and Canned Foods Act, in the case of those destined for export, continues to grow in strength.

It appears therefore, highly probable that this sentiment will, in the near future, have the effect of compelling our provincial and municipal authorities to provide for the establishment, under provincial legislation, of such a system of domestic meat inspection as will place the products offered by the ordinary retail butcher, on a footing equal in quality and soundness, with those emanating from the establishments operated under the provisions of the above named measure.

FRUIT, VEGETABLES AND CONDENSED MILK.

This work has progressed steadily. Through the efforts of your inspectors the sanitary conditions of the factories engaged in the packing of fruit, vegetables and milk show marked improvement.

The quality of the raw materials used with few exceptions gives little cause for complaint.

This industry is growing rapidly, many new plants are now in course of construction while numerous others are contemplated.

This will no doubt produce a keener competition and in consequence there exists the danger of the manufacture of what might properly be called a second class product.

Such a condition could be effectually met by the early adoption of satisfactory standards.

A list of the establishments now under inspection and a statement of the results of the post mortem inspections in these establishments from April 1, 1911 to March 31, 1912 is given below:—

ESTABLISHMENTS under Inspection, March 31, 1912.

No.	Name.	Place.	Inspectors.
1	Fowler's Canadian Co.	Hamilton	C. J. Johannes, V.S. W. A. Morrin, V.S. J. E. A. Duhamel, M.V. J. Edgecombe.
2A	Mathews-Laing, Ltd.	Hull, P.Q.	W. H. Marriott, V.S. (pro tem). J. F. Campeau, M.V. A. C. Tanner, B.V.Sc. J. Terrance.
2B	Mathews-Laing, Ltd.	Brantford	W. Kime, V.S. J. T. Davidson, V.S.
2C	Mathews-Laing, Ltd.	Peterborough	W. A. Henderson, V.S. J. O. Guertin, M.V.
2D	Laing Packing & Provision Co	Montreal.	F. H. S. Lowery, V.S. R. D. Boast, B.V.Sc. E. Dufresne, M.V. J. R. Young. D. McDonald.
25	West End Abattoir.	Pointe St. Charles	W. H. James, V.S. J. N. L. Couture, M.V. S. G. Bright, B.V.Sc. L. J. Demers, M.D., M.V. C. E. Derome, M.V.
4B	Wm. Davies Co., Ltd.	Montreal.	J. W. Symes, D.V.S. F. A. Walsh, V.S. C. H. Weaver, B.V.Sc. H. Macey.
22	Montreal Union Abattoir.	Montreal.	E. G. Lemieux, M.V. N. W. Reid, M.V. M. H. Milton, B.V.Sc. C. D. Bancroft, D.V.S. S. Jaques, V.S. H. Beaudoin.
24	Wm. Clark.	Montreal.	A. R. Douglas, D.V.S. E. Lallemand.
29	N. K. Fairbank Co.	Montreal.	H. Mizener.
3	Montreal Packing Co.	Pointe St. Charles	R. Benoit.
4A	Wm. Davies Co., Ltd	Toronto.	D. C. Tennant, V.S. W. Moynihan, V.S. R. D. Orr, V.S. A. A. Belanger, M.V. W. J. Blainey. P. J. Kelly. W. Howard.
2E	Mathews-Laing, Limited	Toronto	A. R. Torrie, V.S. T. W. R. MacFarlane. D. A. Irvine, V.S. E. Cox.
7	Harris Abattoir Co.	Toronto.	A. C. Walker, V.S. J. W. Purdy, V.S. D. Brown. (T. Babe, V.S.)

ESTABLISHMENTS under Inspection, March 31, 1912—*Continued.*

No.	Name.	Place.	Inspectors.
28	W. Wight & Co.	Toronto	W. Lawson, V.S. (M. W. Everett.)
18C	Swift Canadian Co.	West Toronto.	D. R. Bone, V.S. R. H. Cook, V.S. F. A. McNally, V.S. C. S. Cain, V.S. J. A. Hodgins. E. Hunter. P. Kingston. J. Langevin, M.V.
9	Gunns Limited	West Toronto.	J. H. George, V.S. J. E. Morse, V.S. H. C. Leslie, V.S. C. Brittain. J. R. Songhurst.
10	F. W. Fearman, Ltd.	Hamilton	A. C. Ramsay, V.S. W. J. Moon, V.S. H. Garrett, B.V.Sc.
11	Ingersoll Packing Co.	Ingersoll.	E. R. Farewell, V.S. G. C. Brownridge, V.S.
13	Whyte Packing Co.	Stratford	C. E. Edgett, V.S. A. W. Beach, V.S.
14	Collingwood Packing Co	Collingwood	W. R. Bell, V.S. A. R. Monroe, B.V.Sc.
17	Jones Packing & Provision Co.	Smiths Falls	J. B White, V.S.
31	O'Keefe & Drew Abattoir Co	Chatham	J. R. Thompson, V.S. W. R. Monroe, V.S.
27	Tillsonburg Packing Co.	Tillsonburg.	T. M. Pine, V.S.
18	Swift Canadian Co., Ltd.	Winnipeg	A. R. Walsh, V.S. J. R. N. Harrison, V.S H. J. Elliott, M.D.V. W. A. Hilliard, V.S.
19	Gordon, Ironside & Fares.	Winnipeg	J. D. Ross, V.S. J. H. Shonyo, V.S. H. Colebourn, V.S. R. H. Lyon.
20	Gallagher, Holman & Lafrance	Winnipeg.	T. H. Richards, V.S. A. Hobbs, V.S. G. Tupling, B.V.Sc.
21	Western Packing Co.	Winnipeg.	F. C. Jones, V.S. R. B. Dellert, B.V.Sc.
23	P. Burns & Co., Ltd	Calgary	E. A. Bruce, V.S. I. Christian, V.S. T. G. McClelland.
18B	Swift Canadian Co.	Edmonton	J. R. English, V.S. C. W. J. Haworth, V.S. F. C. Bishop, V.S.
33	Dominion Meat Co.	Calgary	C. Maconachie, V.S.
50	Davis & Fraser.	Charlottetown	A. C. Lundie, V.S.

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ESTABLISHMENTS under Inspection, March 31, 1912—*Concluded.*

Under Temporary Inspection.

No.	Name.	Place.	Inspectors.
44	Lambton Packing Co.	Petrolia	F. L. Wingate, V.S.
31	Delhi Canning Co.	Delhi	C. L. Wallace, V.S.
	Chief, Meat Inspection Division		R. Barnes, V.S.
	Canning Inspectors		C. S. McGillivray. W. A. D. Graham. A. Bowlby.
	Travelling Inspector		H. H. Ross, V.S.
	In charge of Toronto		L. A. Willson, V.S.
	" Montreal		M. J. Kellam, V.S.
	" Winnipeg		C. D. McGilvray, M.D.V.
	" Prince Edward Island		W. H, Pethick. V.S.

DISEASES found at Establishments under Inspection.

Disease.	CATTLE.			SHEEP.			SWINE.			Poultry.
	Carcases	Portions.	Lbs.	Carcases.	Portions.	Lbs.	Carcases.	Portions.	Lbs.	
										Lbs.
Abscess	13	20,487		10	94		11	1,443		
Actinomycosis	9	6,364						487		
Adhesions		1,306			71			2,204		
Albuminous degeneration		362			90					
Atrophy		15								
Bruises	95	9,910	230	28	620	6	27	3,685	11,322	
Cripples		110			22		1	5,508		
Cysts		49						41		
Cysticercus Bovis	127	31								
Cysticercus cellulosae							121	31		
Cysticercus tenuicollis				2	4			11		
Congestion		30						310		
Cirrhosis		7						13		
Decomposed									278	
Dirty		24	624		4			2	354	
Emaciation	49			73			21			
Enteritis	7			2	2		22			
Emphysema								546		
Hernia	1	1			1		1	41		
Hydræmia	79									
Hydremic cachexia				28						
Hypertrophy		7						16		
Hog Cholera							37			
Immaturity	722									
Improper bleeding	9			8			42			
Inflammation							5			
Icterus				1						
Jaundice	3			5	2		14	10		
Metritis	13			2			6			
Mucoid degeneration	30									
Mammitis		27						10		
Melanosis	2	5								
Necrosis	1	340		1	1,051			5,544		
Nephritis	14			4			7			
Parturition	3									
Parasites		8,349		1	24,236			23,568		
Pericarditis	36			2			9			
Peritonitis	21			4			51			
Pleuritis	7			4			30			
Pneumonia	55			22			98			
Pyæmia or septicaemia	96			42			207			
Sexual Smell	1						76			
Skin diseases							1	61		
Sarcoma	3						4			
Sour	5		502,148			9,055	2		208,377	12,702
Septic infection	4	1								
Tuberculosis	1,649	16,836					2,020	411,484		
Tumours	6	230		1	2		5	12		
Uræmia	1									
Various	11	86		1	3		20	353		
Total	3,072	64,577	503,002	241	26,202	9,061	2,838	455,380	220,331	12,702 and
Found dead	107			143			1,680			672 car.

The following summary shows the results of post mortem inspections of cattle, sheep and swine from April 1, 1911 to March 31, 1912:—

Cattle marked 'Canada Approved'	405,329	
Carcases of cattle 'condemned'	3,072	
Percentage of cattle 'condemned'		·15—1
Portions of cattle 'condemned'	64,577	
Sheep marked 'Canada Approved'	376,196	
Carcases of sheep 'condemned'	241	
Percentage of sheep 'condemned'		·06
Portions of sheep 'condemned'	26,202	
Swine marked 'Canada Approved'	1,850,159	
Carcases of swine 'condemned'	2,838	
Percentage of swine 'condemned'	·15	
Portions of swine 'condemned'	455,380	
Total number of carcases 'passed'	2,631,684	
Total number of carcases 'condemned'	6,151	
Percentage of carcases 'condemned'		·23
Total number of portions 'condemned'	546,159	

During the course of re-inspection, the following meats were condemned:—

—	Cattle.	Sheep.	Swine.	Poultry.
Sour	502,148	9,055	208,377	12,702
Dirty	624	.....	354	.....
Bruised	230	6	11,322	.....
Decomposed	...	.....	278	.....
Total	503,002	9,061	220,331	12,702

Total amount on re-inspection = 745,096 lbs.

LIVE STOCK BRANCH.

In my last annual report I dwelt at considerable length on the serious and disquieting fact that live stock production is not keeping pace with the gratifying progress made by the country in almost every other respect.

Commenting on the statistics for 1910-11 which were very discouraging, although, I regret to say, less so than are the corresponding figures for the year just past, I took occasion to emphasize the statement often previously enunciated, that inasmuch as agriculture, which is and must always be, the mainstay of Canada, cannot possibly enjoy permanent prosperity unless the live stock industry, the sheet anchor of the successful husbandman, is in a flourishing condition, there should be no cessation of intelligent effort and no grudging of reasonable expenditure to ensure the proper development of that industry.

The lack of interest in live stock production evinced during recent years by many farmers, especially in the western provinces, while superficially apparently due to a number of widely varying causes, some of which are, of course, local and temporary, is, in my opinion, chiefly attributable to one condition, deeply underlying the whole regrettable situation.

With regard to those agricultural staples for which there is a remunerative home demand, and those in regard to which the export trade has been systematically

organized and fairly conducted, the farmer generally feels that he is reasonably sure of obtaining their actual market value. On the other hand, the peculiar conditions which have hitherto governed the Canadian trade in commercial live stock, have been such as, in many instances, to leave the producer practically helpless in the hands of the dealer, who, as a rule and very naturally, when there is nothing to compel him to do otherwise, pays only the lowest possible price which he can get the farmer to accept, regardless of actual market value.

In this, as in other things, human nature has to be reckoned with, and to those familiar with the conditions under which the western grain trade was carried on prior to the introduction of organization among the producers, to say nothing of other staples which, at an earlier day, were exploited in a like manner, it must be evident that the greatest need of our decadent trade in live stock is the systematic development of modern methods of marketing, preferably co-operative, but in any case, such as will ensure to the producer a fair and equitable price for that which he may have to sell.

Fluctuations in value, sometimes very considerable, must of course, occur in accordance with the law of supply and demand, but for these an effective remedy has not yet been found, although a praiseworthy effort in this direction is now being made by the various countries interested in the International Institute of Agriculture at Rome. As has been demonstrated, however, in the case of other agricultural staples, it is quite possible for growers of live stock to protect themselves, by intelligent co-operative action, against those unfair and unscrupulous buyers who, as matters now stand, are only too often able to manipulate markets and prices to their own temporary advantage.

Briefly therefore, it would appear that the most important phase of the task confronting those desirous of permanently increasing live stock production in Canada, is that of providing a sound and reliable market, capable of absorbing the total output, no matter how great it may eventually become.

With the home market established on a sound and equitable basis and the profitable disposal of any possible surplus provided for through carefully conducted and controlled export channels, it is practically certain that live stock production would very shortly regain its normal proportions.

It would, of course, be impossible, even under the most favourable circumstances, to guarantee continuous high prices, but so long as the figures obtainable were fair and just and as high as might reasonably be looked for in the face of honest competition, our farmers would in this as in other matters, be found willing to accept the situation.

The need for intelligent action along the lines above indicated is in no wise lessened by the fact, now daily becoming more evident, that the country is already on the eve of a revival in the live stock industry.

The high prices now prevailing as a result of the continued shortage and the increased consumption of meat and meat food products, due to the present era of development and prosperity, are already beginning to exercise a marked influence on the market for breeding stock. This may be safely taken as an indication that during the next few years there will be a distinct advance in live stock production.

Unless, however, proper provision is made for the legitimate and profitable disposal of the animals when produced, the old story will be repeated and low prices will again drive the discouraged stock-grower from the field.

The present time would, therefore, appear to be admirably suited for the inauguration of a sound and sane market policy, and I have no hesitation in submitting for your consideration the suggestion that this phase of the question should be accorded your most careful consideration, as well as that of the officers of this branch of your department.

In this connection much useful ground has already been broken through the comprehensive investigation of the market conditions affecting mutton and wool,

which, during the past two years has been conducted by this branch of your department through the agency of Messrs. Dryden and Ritch, acting under the direction of the Live Stock Commissioner.

The report of these gentlemen, issued in January last, is in itself so full and complete that any further reference to or review of its contents would appear to be superfluous.

The marked interest aroused through the Dominion by its wide distribution has been sustained by the series of meetings now being held under the auspices of this branch, acting in collaboration with the different provincial departments of agriculture.

The generous grant to the Dominion Sheep Breeders' Association which you have recently authorized, will enable that body to undertake many useful activities, not the least among which should be the upbuilding, on the foundation already laid by this branch, of that profitable and permanent interprovincial trade in pure-bred sheep, which more than any other possible factor, is calculated to bring about the much needed revival of the commercial side of the industry.

I desire respectfully to congratulate you on your readiness to approve and extend the policy of aid to Thoroughbred stallions, which was adopted only during the last fiscal year, although for a long time urged upon the department by those interested in the improvement of the light horse stock of the Dominion, with especial view to the production of animals suitable for army purposes, which, in the event of their being required, would be of infinitely greater value to the British Government, as well as to our own, than the useless nondescripts of like size and weight, now annually produced.

With the view of giving further publicity to the conditions on which the aid in question is now given, it has been thought advisable to print, as an appendix to this report, the various forms used in that connection.

The number of cows entered for test in the Canadian Record of Performance has largely increased during the past year, a total of 801 being entered at the end of the fiscal year, 1911-12, as compared with the total of 586 entered during the year ending March 31, 1911. As stated elsewhere, a number of inspectors have been added to the staff for the carrying on of this work, thus affording facilities for a more efficient and satisfactory service. A new feature was introduced in January of this year when arrangements were made for reports by the several inspectors as to the quantity of fodder fed to the different cows under test, the approximate cost of the milk being produced and the nutritive composition of the ration. From the interest which has developed in this new phase of the work, it should ultimately prove an important adjunct to the Canadian Record of Performance.

You were good enough to approve of the calling under the auspices of your department of a convention of the Canadian National Live Stock Association in Ottawa, in Feburary of this year. At this convention a number of important subjects relative to and affecting live stock were discussed. The report of this gathering, in which will be found embodied the comprehensive resolutions defining the views of the members of the association, will be found published as an appendix hereto.

A special officer has been engaged for some months in making a study of the methods followed in the production and marketing of eggs and poultry in Ontario and Quebec, and the manner in which poultry products are handled from producer to consumer. Much valuable information has already been secured and the foundation laid for definite constructive work in the interests of the industry.

As it was thought that full advantage might not have been taken by the breeders of French Canadian horses in some districts in the province of Quebec, of the opportunities afforded them of having their animals examined at the time of previous inspections, a further re-inspection of French Canadian stallions and mares for registration as foundation stock has been arranged for and is now in progress. It is expected that this work will be finally concluded during the coming summer.

Assistance has been continued to the various provincial organizations in the interests of the live stock industry, and the furnishing of expert live stock judges and lecturers in response to requests from the various provinces has, during the past year, constituted an important feature of the work of the Branch. The services of these lecturers and judges are in constant demand, the advantages accruing from this interchange of opinion and thought by the live stock men of the various provinces being now generally recognized and the policy of your Department in this connection receiving unanimous endorsation.

Report No. 4 of the Canadian Record of Performance has been published during the past year and appears as an appendix hereto. A bulletin on 'Horse Breeding and the Rearing of Colts,' has also been published and widely distributed as has also the report of Mr. H. S. Arkell, B.S.A., Assistant Live Stock Commissioner on 'Government Assistance to Agriculture in certain countries of Europe,' both of which appear as appendices to this report. The special report of the Sheep Commissioners, Messrs. Dryden and Ritch has been published in attractive form and as stated previously in this report, is so full and comprehensive that further reference to its contents is unnecessary, in view of the fact that it has been very widely distributed. The steady demand for the publications issued by the Branch is an evident indication that they are appreciated by farmers and stock men generally.

I have the honour to be, sir,

Your obedient servant,

J. G. RUTHERFORD,
Veterinary Director General and Live Stock Commissioner.

Honourable MARTIN BURRELL,
Minister of Agriculture,
Ottawa, Ont.

APPENDIX No. 1

G. Hilton, V.S., Chief Veterinary Inspector,

Ottawa, March 31, 1912.

Sir,—I beg to submit herewith my report for fiscal year ending March 31, 1912.

At the commencement of this period I visited the Niagara Peninsula accompanied by Inspector Stork, of Toronto, for the purpose of interviewing the reeves of several municipalities regarding the advisabiilty of enforcing muzzling orders in their respective districts. The rabies situation was thoroughly discussed, your policy in dealing with outbreaks of this disease explained, and the responsibility resting upon municipal authorities in this connection distinctly outlined. Some of the municipalities promptly enforced suitable restrictions, others did so at first reluctantly, but eventually assisted very materially in controlling the outbreak.

On April 20, assisted by Inspector Tennent, I took charge of the annual examinations of this Branch for Veterinary Surgeons at London, Ont., and the following day visited Windsor, where, accompanied by Inspector Jones, I discussed with the railway representatives matters in connection with the satisfactory equipment of transit hog cars. The object of the special requirements of Ministerial Order 33 was fully explained and a distinct understanding arrived at with the representatives in question. A ruling in this connection was then given to the inspectors concerned, in order that their decisions might be uniform in accepting or refusing the entry of such cars.

While at Windsor I investigated, with Inspector Jones, a small suspected outbreak of hog cholera, and upon confirming this disease wired Inspector Rowe to assist the former officer in eradicating the outbreak.

I then proceeded to Sarnia, and after interviewing Inspector Brown left for Bridgeburg, where dissatisfaction existed in some of the municipalities in this vicinity, owing to the fact that while they were enforcing muzzling orders others were not. Accompanied by Inspector Philps I again consulted several of the reeves of the districts concerned. The seriousness of the situation was thoroughly explained and the importance of effectively enforcing the muzzling orders pointed out.

While admitting the necessity of such measures and their responsibilty in the case, some of the reeves did not care to take any active part in their enforcement. They finally, however, agreed to enforce suitable restrictions and were advised that if at any time they experienced difficulty in this connection prompt assistance would be given by the officers of this Branch.

I then returned to Ottawa, where I remained until the 27th of May, leaving on that date for the western provinces.

In accordance with previous arrangement, Inspector McGilvray met me at Kenora, and accompanied me as far as Winnipeg. This gave me an opportunity of discussing matters with him relative to the work of this Branch in the provinces of Manitoba and Saskatchewan.

Upon arriving at Regina on the 29th of May, I discussed matters in connection with the work in that province with Inspector Tamblyn, and in order to facilitate the work a few changes were made in the headquarters of some of the officers.

I proceeded to Medicine Hat on the 1st of June, and interviewed Inspector Hargrave regarding the work in the province of Alberta. While at this point I had the opportunity of discussing with several range riders matters in connection with their

particular work. Some difficulty having arisen in connection with the dipping on one of the reserves, owing to the resignation of the Indian Agent, the situation was discussed with the Veterinary Officer in charge of the district and then referred to you.

On the 6th of June, I accompanied Inspector Hargrave to Lethbridge and visited the quarantine station for the purpose of supervising the mallein test of a horse, over which more or less difficulty had previously been experienced, and incidentally to talk over the work at this station with the officer in charge. While at this point I met Inspectors Busselle and Gallivan, and Car Inspector Harris, and talked over with them several matters of importance.

On our way to Coutts the following day we met Range Rider Murphy and discussed matters in connection with his official duties with him. At Coutts we interviewed Inspector Patton and inspected the quarantine stable and corrals.

We returned to Medicine Hat the same evening, where I remained for a few days, and then, accompanied by Inspector Hargrave, left for Calgary en route to Edmonton. At the former point we interviewed the inspectors stationed there, and discussed with them matters pertaining to their particular duties.

On our arrival at Edmonton on the 16th we met Car Inspector Miller and W. H. Shaver, who was later appointed to assist the former officer in his work. Mr. Shaver was thoroughly instructed in the details of his duties, and was therefore in a position to commence work immediately his appointment was confirmed. While at this point Inspector Caldwell consulted us in connection with some trouble experienced by him in dealing with glanders on an Indian reserve. The situation was thoroughly discussed, and the following day we accompanied him to the reserve in question, where we interviewed the Indian Agent and made satisfactory arrangements to overcome the difficulty.

Returning south we stopped over at Lacombe and consulted Inspectors Talbot and Harrington, and the following day Inspector Hargrave proceeded to Medicine Hat, while I went on to Kamloops. I was met at this point by Inspector Tolmie, and discussed with him and Inspector Thomson matters in connection with the conditions on the range and the enforcement of the mange regulations.

I left the following day, with the former officer, for Vancouver, arriving there on the 21st of June; we visited the office of this Branch, interviewed Inspector Ransom, and, accompanied by Car Inspector Kininmonth, inspected the car cleaning plant of the C.P.R. The system adopted here is an excellent one, the work being performed in a most satisfactory manner.

The quarantine station on Triumph St. was inspected, and the contractors for the new quarantine stable were advised relative to some minor details in the construction of the building.

I then proceeded to Victoria and remained at that point for two days. While there I visited the office rented for the use of Inspector Tolmie, and accompanied Inspector Richards to the quarantine station. The latter buildings are suitably located, well isolated and situated at a convenient distance from the wharfs. They are light, sanitary, well kept and in good repair.

Returning to Vancouver on the 23rd I met Dr. Hadwen and discussed with him matters in connection with his work. The following day I left for Nelson, with Inspector Tolmie, arriving there on the 25th. At this point, accompanied by Inspector Frank, I inspected the quarantine site and found nothing of any value remaining of the recently burned stable, although the adjoining corrals were intact and in good repair. I found the stable, which is now being rented, conveniently situated and apparently satisfactory.

Leaving this point on the morning of the 26th we arrived at Grand Forks the same day. The quarantine stable was inspected, and Inspector Paxton consulted regarding his work, after which we left for Oroville, Wash., en route to Keremeos. Inspector Coristine, in accordance with previous arrangements, came down from Osoyoos to Oroville, and discussed matters relating to his work with us.

Arriving at Keremeos on the 27th we looked over the Great Northern Railway Yards, with Inspector Jermyn, with a view to locating a suitable site for the erection of a quarantine building, and then returned to Midway. At Midway we again met Inspector Paxton and inspected the quarantine station at this point.

We then proceeded to Nelson, and soon after our arrival Inspector Tolmie left for Vancouver, while I went to Kingsgate. Arriving there on the 30th I met Inspector Mitchell, and with him looked over the quarantine buildings, after which I left for Gateway. On my arrival at the latter point I found Inspector Foster absent on field duty. I, however, inspected the quarantine buildings and then went on to Lethbridge, arriving at the latter point on July 4.

The following day I went to Coutts and made a special investigation of certain complaints at this point, after which I returned to Medicine Hat, where I remained for a few days.

Upon receiving instructions from you, Inspector Tolmie was wired to transfer Inspector Thomson from Kamloops to Keremeos, and Inspector Morgan, who had been engaged for some time in the mange area in Saskatchewan was located as quickly as possible, and instructed to proceed to Kamloops where his services were urgently required in connection with the construction of dipping vats.

Owing to the removal of Inspector Thomson from that point Inspector Gallivan was temporarily transferred to Kamloops to take charge of dipping operations.

I visited the Cardston district accompanied by Inspector Hargrave on July 10 for the purpose of consulting an owner, who objected to having a few non-clinical reactors destroyed. These were valuable animals and as none of them exhibited any symptoms of disease, a great deal of difficulty was experienced in convincing the owner that they were actually affected.

As it was our intention to visit Lethbridge on the 11th for the purpose of witnessing a post mortem on a non-clinical reactor, the owner suggested accompanying us. This having been agreed to, we proceeded to Lethbridge on the date mentioned, and had no difficulty in demonstrating glanders lesions in the carcase of the animal in question.

Advantage was taken of this opportunity to thoroughly discuss all matters in connection with your glanders policy, and the owner was apparently convinced regarding its soundness as he consented to the destruction of the reactors in preference to holding them for retest under the forfeiture clause of the regulations.

I then proceeded to Medicine Hat, and the same evening left for Brooks. The following day I witnessed dipping operations at an excellent dipping plant on the Little Bow river. I found that the dipping mixture had been well prepared and maintained at a suitable temperature during treatment. The cattle were in good condition, but there was no difficulty in detecting mange in a number of them as they swam through the vat. With few exceptions these animals swim with their withers exposed, and pass far too quickly even through the longest vats. Although the mangy animals are cut out from the herd before treatment, and put through the vat separately, so that closer attention can be given them, a certain number escape detection until they are going through the vat with the supposedly healthy herd; special care is, therefore, required to detect these animals and impede their progress through the vat. In this connection I would say that trouble is often experienced by the officer in charge in holding them long enough in the vat to insure effective results, as many owners object to the delay which naturally occurs. Their objection is due chiefly to the impracticability of holding large herds without sufficient feed for lengthy periods, and the difficulty of keeping them from mixing, when only a part of the herd are put through the vat at one dipping. I, therefore, discussed this phase of the question thoroughly at every opportunity with the inspectors and range riders in the mange area, and pointed out to them the necessity of exercising the utmost vigilance and care in dipping operations.

Returning to Medicine Hat I remained there for a few days and then left for Regina on July 16. Soon after my arrival I visited North Portal, accompanied by

Inspectors Tamblyn and Robb, and while there obtained particulars regarding the installation of an engine for pumping purposes at the quarantine station.

The following day I stopped off at Moosejaw en route to Regina and interviewed Car Inspector Yake.

On July 21, accompanied by Inspector Tamblyn, I proceeded to Saskatoon and Prince Albert and interviewed the inspectors stationed at these points, and discussed matters with them relative to their work. We left the latter point on July 22 and interviewed a gentleman at Osler, who had previously forwarded complaints to you regarding the manner in which the veterinary inspectors were dealing with outbreaks of glanders. We discussed matters fully with him, and found that he had no actual knowledge of the nature of glanders, the mallein test, or of your policy in this connection, and that he had no personal criticisms to offer. He explained that he had made the complaints upon the request of a number of Germans, who were also unfamiliar with the regulations. Upon completing my investigation I was able to report that there was no real grievance in this district and that the inspectors had been performing their duties in a regular manner.

We returned to Regina on July 23, and two days later I left for Winnipeg, where I interviewed Inspector McGilvray and then proceeded to Ottawa.

During the month of August I visited Carp, and investigated a suspected outbreak of anthrax in that vicinity, which, however, proved to be one of black-quarter. The veterinarian reporting the case was, therefore, advised accordingly and the necessary vaccine forwarded.

On the 22nd of this month I visited Toronto, attended the meetings of the American Veterinary Association, and returned to Ottawa on the 25th, where I remained until September 8. On the latter date I left on an inspection tour of the boundary ports in the maritime provinces, arriving at Charlottetown on the 9th. At this point I interviewed Inspectors Pethick and Leckie, visited the Intercolonial Railway stock-yards, and also the sheds erected for the accommodation of stock on the Black Diamond Navigation Company's wharf.

I met Inspector Townsend at Pictou on the 11th, who accompanied me to New Glasgow, where I remained until evening, and then left for Sydney. I arrived there the following morning, and accompanied by Inspector Thurston proceeded to North Sydney, and inspected the Intercolonial Railway stock-yards, as also the accommodation provided for stock awaiting embarkation on the wharfs, and then returned to Sydney.

On September 13 I left for Halifax, where I visited the quarantine station and wharfs, and left the following day for Yarmouth to interview the inspector in charge of that port.

I proceeded to St. John on September 15 and, accompanied by Dr. Frink, visited the quarantine station and the Canadian Pacific Railway cattle-sheds.

On the 18th I visited McAdam Junction, interviewed the inspector in charge, and looked over the suitable available sites for a quarantine station.

The following day I returned to St. John, and after an interview with Inspector Frink, left for Ottawa. I remained at headquarters until September 25, when I left for the Sault Ste. Marie district, and looked into the hog cholera situation there, returning on October 3.

On the 16th of this month I visited Beaconsfield district and supervised the second dipping for export purposes of a flock of pure-bred Southdown sheep.

I visited Niagara Falls on November 5, where I met Dr. Watson and discussed with him and the owner the advisability of ear-marking a number of suspected reactors in a pure-bred herd of cattle, which had been tested with tuberculin supplied by this branch under the usual conditions. Your policy in this connection was clearly explained and these animals were ear-marked with the owner's consent in preference to holding them for the necessary period for retest.

On my return to Niagara Falls I met Inspector Cooke, and with him interviewed the Michigan Central Railway authorities with a view to selecting a suitable site for their car-cleaning yard at Montrose. The site previously chosen by the company was found to be the most suitable and was therefore recommended.

I then left for Bridgeburg and interviewed the inspector at that port, after which I returned to Toronto, visited the office of this branch and arrived at headquarters on the 11th.

On the 13th I proceeded to the western provinces, and took charge of the work in the province of Saskatchewan during Inspector Tamblyn's absence. Soon after my arrival at Regina I found it necessary to proceed to Saskatoon to confirm a suspected outbreak of hog cholera. The disease, which was of a very virulent nature, was fortunately limited to one premises. These were well isolated, and by the enforcement of active, stringent measures no further outbreaks occurred in this vicinity.

Upon Inspector Tamblyn's return to Regina, I visited Moosejaw and Milestone with Inspectors McGilvray and Hargrave. At the former point I met the recently appointed western car and yard inspector, and instructed him fully regarding his duties. At Milestone we examined a number of cases of dourine, and witnessed an autopsy on one of them, conducted by Inspector Hargrave.

The following day I returned to Regina, Inspector Hargrave to Medicine Hat and McGilvray to Winnipeg. On December 15 I proceeded to Medicine Hat and interviewed Inspector Hargrave regarding a complaint relative to conditions at one of the quarantine stations on the Alberta boundary. We visited this station the following day, investigated the charges and found that there was little cause for complaint.

I returned to Regina December 18, and left the following day for Winnipeg. At the latter point I again interviewed Inspector McGilvray, and with him investigated an outbreak of Lip and Leg Ulceration in sheep some distance out of the city.

I left for Fort William and Port Arthur the same evening, and upon my arrival at the latter point, interviewed Inspector Fraser relative to the existing conditions in his district. We visited a few premises, where more or less trouble had been experienced in enforcing the hog cholera regulations, explained to the owners the necessity for their strict observance, and advised them to co-operate with this department in the eradication of this malady.

I then returned to Ottawa and remained at headquarters until January 4, when I proceeded to Fort Coulonge and held autopsies on the carcases of cattle which had reacted to tuberculin supplied by this branch. The following day I returned to Ottawa, where I remained until the 21st. On the latter date I left for Windsor for the purpose of deciding upon a suitable location for the erection of a quarantine stable. After having chosen the site I looked into several other matters of importance at this point, and then proceeded to Sarnia, where I interviewed Inspector Brown. I then left for London, met Inspector Tennent and proceeded with him to St. Thomas, where we interviewed the Board of Health in connection with an outbreak of rabies in that city. I returned to headquarters on the 28th, and with the exception of a visit to Renfrew with Inspector Hall, on February 9, where we investigated a reported case of glanders, have since remained at headquarters.

A detailed report of each of the above investigations was forwarded to you upon completion of the work.

I have the honour to be, sir,

Your obedient servant,

GEORGE HILTON,
Chief Veterinary Inspector.

The Veterinary Director General,
Ottawa.

APPENDIX No. 2.

R. Barnes, V.S., Chief, Meat Inspection Division.

Ottawa, March 31, 1912.

Sir,—I have the honour to submit my annual report for the year ending March 31, 1912.

During the year my duties have been for the most part confined to your office. Short visits have been made to Montreal and Toronto and one or two other places in order to discuss and adjust minor points of difference which have arisen and which have been settled in a manner satisfactory to all concerned.

While there have been quite a number of additions to the staff, yet, owing to transfers to the Contagious Diseases Division, resignations and dismissals, I may say that the force is still barely sufficient to meet the increased needs of the service occasioned by the larger number of animals slaughtered during the past year at establishments operating under the Meat and Canned Foods Act and the number of new plants placed under inspection. This limitation is particularly evident during certain seasons when the slaughtering is so excessively heavy as to necessitate the operation of the plants during a part of the night, but this extra work has been carried on by the regular staff faithfully and with little complaint.

This condition, while unsatisfactory, is one that is very difficult to overcome. During the late winter and spring months, no more than a sufficient complement of officers is stationed at the different establishments to comfortably perform the required work. As summer approaches it becomes necessary to arrange for the annual vacations, and those who remain on duty must carry on the inspection. Fortunately at this season the slaughtering is the lightest of the year, which alone makes the present arrangement possible and fairly satisfactory. Beginning in the fall, however, and lasting well on into the winter months, the establishments are running to full capacity, and during this time your officers are obliged to return for from two to four hours night duty. It is unfortunate that just at this time, too, the staff is subject to a constant drain for temporary work in the maritime provinces, as also in the chicken canning factories in Ontario.

To this increased amount of work and strain, and to the fact that the work on the killing floors is carried on under conditions which at the best cannot be considered as ideal from a sanitary standpoint, may be attributed the somewhat unusual amount of sickness which during the winter months has affected many of your inspectors.

It is gratifying to know that the demand for meat and meat food products bearing the Inspection Legend is steadily increasing, and I feel assured that if the public fully appreciated all that such marking implies, viz: freedom from disease and the handling and preparation under sanitary conditions, the operation of uninspected slaughter houses would soon cease. In this connection I may say that the managements of inspected establishments have not placed these facts before their purchasers by judicious advertising to the extent that might be possible.

Steady prices have prevailed throughout the year, which has, no doubt, been a factor in bringing forward to the markets the increase of, approximately, 50,000 sheep and lambs and 400,000 swine. While hundreds of poorly fed and unfinished cattle, as also grass-fed calves of inferior quality five to six months old, were killed, the

total slaughter shows no increase over the preceding twelve months, which may be safely taken to indicate that the production of beef cattle is not keeping pace with that of other meat food animals.

During the past season, despite what a few years ago would have been considered prohibitive prices for canning purposes, a large number of factories engaged exclusively in the canning of poultry were placed under inspection. This may in a great measure be attributed to the high cost of all other meat foods making it possible for the manufacturer to place on the market a wholesome canned meat food at a price that would attract a purchaser, yet I feel that it is not presuming too much to say that the demand for this class of food has been to some extent increased by the assurance that it is actually what the label purports it to be.

Although the exports to Great Britain for the last twelve months show an increase over the previous year of 13 per cent, there have been imported from the United States by establishments under inspection 10,000,000 pounds of pork and pork products.

The total condemnations for disease in cattle show a marked decrease which may be attributed to the small number of old milch cows (canners) slaughtered, the managements of establishments apparently not wishing to run the risk of their condemnation.

The losses for disease in hogs show practically no change, yet the number of cattle and swine affected with tuberculosis shows a slight increase.

In cattle this is most marked in the older settled portions of the Dominion, and in hogs from dairy districts where the by-products from the manufacture of butter and cheese are not pasteurized. This is also applicable to districts where corn forms the principal feed for cattle and where the hogs are given the same run or yards.

The owners of establishments operating under the provisions of the Act and regulations have continued to show a desire to observe their requirements. Sanitary conditions have improved and thousands of dollars have been expended on additions and improvements whereby proper sanitation may be more easily maintained.

The agents of the various transportation companies have, with few exceptions, insisted upon the production of the certificates necessary in connection with the transportation of meat and meat food products in export trade.

The Meat and Canned Foods Act, having been in operation a little over four years, the Minister, on your suggestion, authorized the calling together of representatives of the packing and transportation interests for the purpose of discussing the various questions which naturally arise in the carrying out of the Act and the regulations made thereunder. The meeting was held on January 17, 1912, and was attended by a fair representation of the meat packers, as also of the transportation companies. Many minor matters were discussed and amicably adjusted.

The most important matter brought up, which was discussed very fully, was the admission into Canada of foreign uninspected meats and meat food products, their interprovincial transportation and their admission into establishments under inspection. No decision was arrived at, the matter being left in the hands of the Minister for consideration. Up to the present no pronouncement has been made.

It was pleasing to note the friendly spirit towards the department shown by the packers throughout the country, and the expression of their approval of the manner in which the requirements of the Act and the regulations have been administered, is much appreciated.

Under the provisions of Section 19 of the Meat and Canned Foods Act, an examination was held by officers of the branch on April 20 for the purpose of obtaining a list of men eligible to fill vacancies which occur from time to time in the service or to meet in some degree the needs occasioned by the rapid increase and extension of the work. Of the 85 veterinarians who presented themselves at this examination, 49 were successful in passing, and of these 12 were subsequently appointed to the Meat Inspection Division.

FRUIT, VEGETABLES AND MILK.

Steady progress is being made in this line of the work. Your inspectors, while few in number, are zealous in the performance of their duties, and have been able to bring about without friction a wonderful improvement in the sanitary conditions of plants engaged in the manufacture of this class of food.

In order that the division may keep abreast of the rapid development of this trade, I am of the opinion that it will be necessary to make further additions to the staff of inspectors as, with the present force, it will be impossible to carry on an effective supervision of the many new plants already in course of erection and of those which will no doubt be built during the coming year.

I have the honour to be, sir,

Your obedient servant,

ROBT. BARNES,
Chief, Meat Inspection Division.

The Veterinary Director General,
Ottawa, Ont.

APPENDIX No. 3.

A. E. Moore, D.V.S., Chief Travelling Inspector.

Ottawa, March 31, 1912.

Sir,—I have the honour to submit to you this, my annual report, for the year ending March 31, 1912.

GLANDERS.

It is with much pleasure I am able to report that this is the first year since my appointment in which I have not personally met with a case of glanders.

I have tested 9 horses, which were suspected and reported by veterinarians, but none of these reacted. I found suspicion due to one of the following causes, namely,—collection of pus in the nasal sinuses, grease heel, injury to the head, and diseased teeth.

Only 4 horses were destroyed this year in the province of Ontario. These were contact horses from an outbreak of last year.

In the province of Quebec 19 horses were destroyed, nearly all in one or two districts where glanders has been prevalent in other years.

Seven horses were destroyed in the province of New Brunswick during the last of March, near the town of Chipman. It is believed that this outbreak came from American horses used in construction work of the Grand Trunk Pacific railway.

The compensation paid for glanders in the eastern provinces this year amounted to $2,673.

TUBERCULOSIS.

I have tested 152 cattle on 12 different premises, 17 of which reacted. These cattle were under the special supervision of this Branch.

I also tested 76 cattle intended for export to the United States, 3 of which reacted.

I applied the intradermal test to 8 cattle, 2 gave a positive reaction, the other 6 did not respond. These cattle had previously been tested in the ordinary way. The results of both tests were identical.

In several instances I held post mortems on reacting cattle at the request of the owners and was able to demonstrate to them the disease in its different stages. I consider that such demonstrations are invaluable in educating the public on tuberculosis.

I have ear-marked 50 reacting cattle in 7 different herds. These cattle were tested by local veterinarians supplied with tuberculin from this Branch.

HOG CHOLERA.

All the serious outbreaks of hog cholera this year have occurred in the vicinities of cities, and in hogs which were fed on swill and garbage collected from the hotels and restaurants. I herewith add a report which I prepared for you some time ago and which may be of interest.

The following is the substance of this report:—

'I have the honour to inform you that in accordance with your request, I have prepared a brief report with reference to outbreaks of hog cholera which I have dealt with, the origin of which is undoubtedly the feeding of uncooked city garbage and hotel swill

'The first outbreak of this kind that came to my notice occurred at Sudbury, Ont., in June, 1903. Four (4) premises were involved, 85 hogs died and 14 contacts were killed. Two of the owners were hotel men, feeding the swill from their own houses, the third owner a woman feeding swill collected around the town, and the other was a butcher who bought a lot of hogs from this woman. There was absolutely no other source of infection traceable. All the other hogs in the community were healthy and no outside hogs had been recently introduced into these herds.

'In November, 1903, there was an isolated outbreak in a herd at Collingwood, Ont., no source of infection could be traced, but the owner was feeding the refuse from the packing-house. At this time there was more or less hog cholera scattered throughout Western Ontario, and it is quite possible that infected hogs may have been sent to the Collingwood packing-house.

'In August and September, 1908, another outbreak occurred at Sudbury and Copper Cliff, starting on two farms where owners were feeding slaughter-house refuse and hotel swill. At first it was suspected that the disease was brought from near Wallaceburg, Ont., but a careful investigation was made on the premises where the hogs originated at Wallaceburg and no trace of hog cholera was found.

'In August, 1908, hog cholera occurred on a farm at Toronto. Some 400 hogs died and 717 sick and contacts were slaughtered. The manager informed me that he had not bought a hog for nearly a year, and then only some boars from a farm where hog cholera had never been known to exist. No other hogs had come in contact with his since then.

'The owner fed his swine on hotel refuse. On examining this refuse I found it contained nearly every conceivable thing, such as uncooked pork rinds, ham and sausage, poultry bones and bacon, chicken and other fowl viscera, beef refuse, mutton and veal refuse, besides all kinds of vegetables and slops.

'I am at a loss to know the origin of this outbreak unless it came through contaminated food.

'In December, 1908, another outbreak occurred near Toronto, where 73 hogs died. No other source of infection could be attributed except from feeding the uncooked city swill.

'In January, 1909, two more outbreaks occurred near Toronto. No source of infection could be discovered and both parties were feeding uncooked hotel swill. These two premises were several miles apart and there was no communication between them.

'In September, 1909, quite a serious outbreak of hog cholera occurred at Ottawa. Fifteen (15) premises were involved, 170 sick and contact hogs killed and 54 died. In every instance garbage-fed hogs were the victims; absolutely no other source of infection could be found. Farmers' hogs in the same neighbourhood, which were never fed garbage, remained healthy.

'Later, in September of 1909, I was called to Toronto to investigate an outbreak of hog cholera at Weston, 365 hogs being involved. There were no contacts or recent importations. The hogs were fed on uncooked hotel garbage from Toronto.

'I carefully examined the garbage in both the Toronto and Ottawa outbreaks and I found a great many uncooked portions of pork, such as rinds from bacon and ham sausages, spoiled pork chops, roasts and portions of ham and shoulders. I found in Toronto whole strings of raw, sour, mouldy sausages. The owner informed me that it was a frequent occurrence to find a bushel basket full in their garbage collection.

'In August an outbreak occurred at Sault Ste. Marie, and was principally dealt with by Inspector Perdue. I visited Sault Ste. Marie in September and I found, as did Dr. Perdue, that the outbreak was entirely among swill-fed hogs, and those in contact with them. No other source of infection could be found. Farmers' hogs in this neighbourhood not fed on garbage, remained healthy. The disease was found on twelve premises, 95 hogs died and 260 killed.

'Last September I visited Winnipeg, Man., on account of hogs dying of hog cholera near that city. In company with Inspectors McGilvray and Macintosh I made a careful investigation, and in every case found that uncooked garbage-fed hogs were the ones affected. There was absolutely no other source of infection that could be found.

'Three outbreaks occurred a little later at Helen Mines, Ont. At first it was thought that the disease might have been taken there from Sault Ste. Marie. This might have been true in one case, but the other two of these outbreaks were, as far as I could determine, not in contact at all with the Sault Ste. Marie hogs, but were fed on the swill from the railroad construction and mining camps.

'In October of this year quite a serious outbreak of hog cholera occurred at Fort William and Port Arthur. This outbreak, as well as those at Winnipeg, Sault Ste. Marie and Kenora, was confined wholly to hogs fed on uncooked garbage. The disease started almost simultaneously on all the different premises in this district. There was absolutely no communication or exchange of hogs among these people and they were scattered in all directions.

'About the last of August or first of September the butchers of Fort William and Port Arthur ran very short of local pork (Canadian) and large shipments were rushed in from the Winnipeg packing-houses. It was from three to six weeks after this, as far as I can learn, that the first hogs began dying near Port Arthur. I was told by the buyers that these shipments consisted largely of United States pork.

'I made a very careful investigation of the whole district in company with Inspector Fraser, with the result that 622 hogs were killed on 24 premises, valued at $5,500. Four hundred and seventy-five hogs died previous to our visit. The garbage-fed hogs in this district all developed the disease, with the exception of one lot. This lot was only fed a small quantity of garbage, which was obtained from a restaurant where only Canadian pork was used.

'I made an inspection of a large number of hogs not fed on garbage near Fort William and Port Arthur, but no evidence of hog cholera could be found. These premises at the Fort William and Port Arthur outbreaks are quite widely separate. All the garbage-fed hogs became sick about the same time, most of them the same week, and there was no communication between these different places.

'You will notice that all the western outbreaks of hog cholera occurred quite closely together, the one at Sault Ste. Marie started in August, at Winnipeg in September, at Kenora and Fort William, the first part of October.

'It is interesting to note that immediately previous to these outbreaks a large quantity of outside pork was shipped into these towns by the Winnipeg packers, who all handle large quantities of United States pork.

'In conclusion I wish to say that in my dealing with hotel swill-fed hogs, I have found the most repulsive conditions. The premises, with the exception of a very few, I found in a most unsanitary condition, many of them were indescribably filthy, and the stench almost unbearable, millions of flies swarmed around, rats, dogs and crows feeding off the decomposing garbage, in fact, everything reeking in filth.

I believe that this material should not be allowed to be fed except under strict supervision, not alone from the serious danger of spreading the hog cholera infection, but also from a sanitary standpoint.

SUSPECTED HOG CHOLERA.

During the year several veterinarians of Western Ontario reported suspected hog cholera. On investigation I found the conditions due to influenza and digestive derangements.

SHEEP SCAB.

During the early spring while investigating an outbreak of sheep scab at La Baie, in the province of Quebec, I heard a rumour that there was some suspected

sheep at Louiseville, a place immediately across the St. Lawrence river from La Baie. On investigation I found several flocks affected, which resulted in our quarantining 227 sheep on 18 farms. This outbreak no doubt originated from across the river.

Late in April I again visited these places and made preparations for the dipping of all the quarantined sheep at La Baie and Louiseville. When the weather permitted, Inspectors Vigneau, Gauvin and Beaudry accomplished the dipping of these sheep in a most satisfactory manner. The usual two dippings in the lime and sulphur dip were ordered.

RABIES.

During the year I made several visits to Western Ontario with reference to the different rabies outbreaks in that part of the province. In several instances the local authorities co-operated with us in passing special by-laws of their own, which very materially assisted us.

Owing to the nature of this malady it is one of the most difficult and unsatisfactory diseases to control. I found that our local inspectors, however, had done excellent work in dealing with these outbreaks.

In February I visited Montreal to investigate a suspected case but found no evidence of rabies. I submitted the brain of the suspected dog to the pathologist for examination, with negative results.

ANTHRAX.

During the summer I visited North Ham, Quebec, to investigate quite a serious outbreak of anthrax, especially in horses in that district. Inspector Whyte, assisted by Inspector Beaudry, dealt with the details of this outbreak. After the vaccination of the exposed stock the disease was soon under control.

I was also called to Martintown, Ont., where two cattle died.

BLACK-QUARTER.

Several cases came to my notice in Ontario through reports of suspected anthrax. I gave the usual advice with reference to controlling this disease.

OTHER DISEASES.

In June a farmer from Newington, Ont., reported a disease in his horses. Acting on this report I visited his premises and found the malady to be cerebro-spinal meningitis.

In Feburary it was reported by the local veterinarian that horses were dying near Glencoe, Ont. On investigation I found one horse dead and five others sick. I decided that the disease was caused by the feeding of mouldy corn stalks. After this food was discontinued the sick animals recovered.

INSPECTING IMPORT HORSES.

During the year I tested three horses in Ontario, which were imported from the United States. In October I examined fifty import horses at Sault Ste. Marie, our officer at that point being absent at the time of this importation.

In November I visited Morrisburg for the purpose of inspecting two horses. I deemed it advisable to return them to the United States.

In March I tested a suspected import horse at Cobourg, which I found to be healthy.

DIPPING EXPORT SHEEP.

During the year I supervised the dipping of 126 sheep for export to the United States.

SESSIONAL PAPER No. 15b

BOUNDARY INSPECTION.

From time to time during the year I visited the following ports for the purpose of consulting with the different officers with regard to boundary inspection:—Quebec, Sherbrooke, Montreal, St. John's, Cornwall, Prescott, Morrisburg, Cobourg, Toronto, Niagara Falls, Bridgeburg and Windsor.

When not on duty travelling I have assisted with the office work of the Branch.

I have the honour to be, sir,

Your obedient servant,

A. E. MOORE,
Chief Travelling Inspector.

The Veterinary Director General,
Ottawa.

APPENDIX No. 4.

C. D. McGilvray, M.D.V.,

Winnipeg, Man., March 31, 1912.

Sir,—I have the honour to submit herewith report for the year ending March 31, 1912, in connection with the Health of of Animals Branch in the province of Manitoba.

The work in connection with the branch here may, for convenience, be considered under three divisions, viz.:

Diseases of Animals Control Division.
Animals Quarantine Division.
Meat Inspection Division.

DISEASES OF ANIMALS CONTROL DIVISION.

The work in connection with this division, as the name implies, has consisted in dealing with the control and eradication of diseases coming under the Contagious Diseases of Animals Act, together with the enforcement of the various requirements of the regulations and ministerial orders relating thereto, as well also as the investigation, from time to time of such other diseases and conditions affecting the health of animals appearing to be of sufficient importance.

The diseases dealt with under this division by your officers of this branch were: glanders, hog cholera, mange in horses, mange in cattle, suspected sheep scab, necrobacillosis, or lip and leg ulceration of sheep, suspected dourine, tuberculosis, and blackleg.

GLANDERS.

The work in connection with the eradication of this disease is still seriously engaging our attention. The number of animals which we found it necessary to slaughter for glanders in Manitoba this year was somewhat larger than the preceding year and is owing to an outbreak being detected in the southwestern part of the province, adjacent to the international boundary. The evidence at hand indicates very clearly that the source of infection in this outbreak was introduced by animals from a certain section of the adjacent state of North Dakota.

GLANDERS STATISTICS FOR MANITOBA.

Summary, showing total number of horses and mules tested and destroyed during the year, by various inspectors here:—

Horses and mules submitted to test.

1st test, 627; 2nd test, 98.

Horses and mules destroyed for glanders.

1st test, 35; 2nd test, 2; without test, 1; total destroyed, 38.
Of this number 9 were clinical cases.
Total compensation allowed, $3,389.98, being an average of $87.10 per animal.

Import horses tested at destination.

1st test, 303; 2nd test, 6.
All of which proved to be healthy.

HOG CHOLERA.

This serious affection of swine has fortunately only made its appearance on rare occasions in Manitoba. Dr. Dunbar, of Winnipeg, reported an outbreak which occurred at Kildonan during 1886, and Dr. Stevenson an outbreak near Carman in 1889. Since the latter time it has not made its appearance here until August, 1911, when it was reported to be in existence among pigs on premises near Winnipeg.

Upon the matter being reported to your office, Inspector A. E. Moore, of Ottawa, was detailed to work in conjunction with us and I desire to express appreciation of the assistance rendered by him. Associated also with Dr. Moore and myself were Inspectors Macintosh and Shonyo, who also displayed considerable zeal and energy in carrying out the work in the eradication of this troublesome disease.

Upon investigation it was found that the outbreak was of a very serious nature and existed on premises in districts where large numbers of swine were being kept. Efforts were therefore immediately directed towards controlling and eradicating the disease from the districts in which it existed, and at the same time to ascertain and determine the source of infection.

Searching inquiry failed to bring forth any evidence or information as to the infection having been introduced by fresh hogs brought into the district, and no fresh hogs had for some time prior to the detection of the outbreak been introduced on to any of the premises on which the disease first manifested itself. A curious and striking feature was that on all of the premises where the disease first manifested itself, the hogs thereon were being fed uncooked swill, kitchen refuse, and garbage, obtained from hotels in the city of Winnipeg, while on other premises in the same district, where they were not feeding such refuse and garbage, the hogs remained healthy and the disease did not manifest itself until a much later date and after ample time had elapsed for them to become affected either by direct or indirect contact, or intermediary means, from the premises where the disease already existed, and in such cases information was obtainable that the infection had been introduced by such means.

On page 18 of the report for the year ending March 31, 1911, of the Veterinary Director General, Dr. J. G. Rutherford, he refers to the possibility of outbreaks of hog cholera being started in suburban districts among swine being fed on uncooked garbage, and our experience and observations in connection with the recent outbreaks of hog cholera dealt with, indicate and support the theory as to fresh outbreaks originating from such a source.

While outbreaks dealt with by us in the district surrounding Winnipeg furnished strong circumstantial evidence in support of this theory, yet outbreaks at Kenora, Ont., furnished even more striking illustration and convincing proof thereof.

During October last, some disease was reported as causing the loss of a number of hogs on the premises of a Mr. H———— at Kenora, and, upon investigation,it was found that the owner of these hogs conducted a hotel at Kenora, and that the hogs were being fed on the swill and kitchen refuse from the hotel. The symptoms manifested by these hogs, as well as the post-mortem lesions, were characteristic of hog cholera. No fresh hogs had been introduced on to the premises in question for a period of one year prior to the time of the outbreak. Hogs were also found to be affected on the premises of three other owners, which were separated from each other by several miles, and upon each of which the swine were being fed uncooked swill and kitchen refuse obtained from hotels in Kenora. The disease manifested itself on all of these premises almost simultaneously, without any possibility of the infection being introduced either by contact or intermediate means from each other's premises.

On two other premises in the same district, hog cholera was subsequently found to be in existence, but the infection in these cases was directly traceable to the introduction on to the premises of hogs which were obtained from one of the parties already referred to.

On further examination of all hogs on premises in the vicinity of Kenora, which were kept under observation and inspected at intervals covering a period of over three months, it was shown that the disease was only found affecting hogs which were being fed on uncooked kitchen refuse and garbage or on premises where garbage-fed hogs had been introduced.

Summing up the outbreak at Kenora, on four premises, 146 hogs were found to be affected, and on each of these premises the only information obtainable as to the source of infection was to the effect that they had been feeding uncooked swill or kitchen refuse obtained from certain hotels. On two other premises on which the disease was found to be in existence among 17 hogs, the source of infection was traceable to hogs having been introduced on to the premises which had been obtained from one of the parties whose hogs were being fed on uncooked hotel swill. The hogs which were thus obtained and introduced were the first to show evidences of the disease, and the history obtained was that the other hogs on the premises had been entirely healthy until coming into contact with the ones referred to. Hogs were inspected at 13 other premises in the Kenora district, the hogs on which, however, had not been fed uncooked swill or kitchen refuse, and these remained entirely healthy, although kept under observation for a period of over three months. Needless to state that during this period due precautions were exercised to prevent any possible infection being introduced from other infected premises.

Regarding the outbreaks in the districts surrounding Winnipeg, our experiences were very similar to those at Kenora. The disease appeared and manifested itself on premises on which the hogs were being fed uncooked swill or kitchen refuse, and then spread from such centres to other premises in the same district.

The question may arise in some minds as to why uncooked kitchen refuse and garbage may give rise to the disease. In this connection it was quite often found by us that hotel kitchen refuse and garbage which was being fed to hogs, contained quantities of pork products (especially sausage and pork cuttings). It also came to our notice that coincident with the appearance of the outbreak, large quantities of pork products from the United States had been imported into Winnipeg and that a distribution of these pork products was made to certain other districts, viz:—Kenora, Port Arthur and Fort William, and that shortly after the distribution of these products there followed, almost simultaneously, at each of these districts, outbreaks of hog cholera, and it would, therefore, appear quite probable that the meats in question had been infected.

The result of our investigations and inquiries therefore furnished very strong circumstantial evidence in support of the belief that many fresh outbreaks of hog cholera are started in suburban districts by feeding uncooked refuse and garbage containing pork or pork products to swine.

Moore, of Cornell, refers to a serious affection, other than hog cholera, occurring among swine as the result of their being fed on kitchen refuse containing certain alkalies. However, while kitchen refuse containing certain alkalies may no doubt be the cause of serious affections and losses among pigs, these alkalies could not have been the cause of the losses occurring among the pigs in the cases referred to, as when the pigs were introduced on to other premises, coming from any of those upon which this hotel swill was being fed, fresh outbreaks were started, showing that the disease was essentially of a contagious nature. Again on all premises which we kept under observation, where the hogs were being fed uncooked swill or kitchen refuse, sooner or later, the disease made its appearance and subsequently outbreaks occurred on other premises in close proximity.

The disease having, in all likelihood, been introduced by this means, and involving premises over a considerable area, widely separated from each other, centres of infection were set up in many districts and serious outbreaks followed thereafter. Once the outbreaks became manifest, the infection was spread in many and varied ways. Among the possible means by which the infection was conveyed from place to place, which came under our notice, were:—by direct contact, that is diseased or contact hogs having been introduced from some of the other premises, or by the premises being in close proximity to each other. Evidences were found of the possibility of the infection having been carried by means of dogs, and where suspicion of this was aroused, steps were taken to prevent it. It was also brought to our notice that certain birds, especially crows and pigeons, appear to be responsible in spreading the disease from place to place. Suspicion was also aroused in many cases as to the infection having been introduced on to the premises by the feet of visitors and others. Again suspicion was also aroused as to the disease being carried in small streams which infected other premises through which the same stream had its course and on which piggeries were located.

The disease in the outbreaks in question appeared in both the acute and chronic types. At the beginning of the outbreaks the acute type was most in evidence and was more marked in severity, becoming less so with the lapse of time and approach of winter. This depended, no doubt, upon the virulence of type or strain of infection, which appeared to become weakened or attenuated with the lapse of time.

In the acute type the symptoms observed were:—sluggishness, capricious appetite, gumming or adhesiveness of the eyelids, accelerated breathing associated with cough in some cases; the appearance of reddened or purplish blotches on the skin, especially round the region of the ears and neck, the under surface of the abdomen and the inner thighs. The bowels, in some cases, were constipated, while in others diarrhœa was present. Progressive weakness, uncertain gait, terminating in loss of power of hind limbs, was frequently noticeable. In the acute cases, affected animals rapidly succumbed to the disease. Hogs ranging in age from two to six months, seemed to be more severely affected, and more rapidly succumbed to the disease than those older.

In chronic cases the same symptoms were in evidence, although less pronounced and the course of the disease more prolonged with progressive weakness and emaciation supervening.

Post mortem lesions were chiefly in evidence affecting the lymphatic glands, lungs, heart, kidneys, spleen and intestines. The lymphatic glands were usually observed to be markedly reddened and enlarged; the lungs showed many small ecchymosis and large pneumonic areas, dark red in colour, consolidated and sharply defined from the healthy lung. Ecchymosis were also observed on the heart surface. The kidneys were darker in colour than normal and presented numerous petechia (turkey egg appearance). The spleen in many cases was greatly enlarged, although in a few cases, it appeared smaller than normal. The intestines, in acute cases, where the duration of the disease had been short, petechia and ecchymosis were noticed on the outer surface, and on the inner surface areas of the mucosæ often appeared congested, inflamed, and more or less swollen.

In chronic cases somewhat similar lesions were observed as those in acute cases, together with characteristic ulcerations of the intestines, noticeably around the region of the ileo-coecal valve, as well also as thickening of the mucosæ in other parts of the intestines.

While formely the specific cause of hog cholera was thought to be due to the bacillus suis, it has in recent years been demonstrated by Dorset and others that this germ only plays the part of an associated or secondary invader and the true infective agent has not been demonstrated, but it is due to a filterable virus which is ultramicroscopic so that at present there is no means of determining the diagnosis of

hog cholera, other than by the characteristic symptoms and post mortem lesions and its infectiveness or contagiousness to other hogs, which can be proved by the transmission of the blood from infected to healthy animals, as well also as by the placing of diseased animals in contact with healthy pigs, which, sooner or later, contract and develop the disease.

HOG CHOLERA STATISTICS FOR MANITOBA.

Number of premises inspected	275
Number of swine inspected, approximate	6,500
Number of premises on which the disease was found to exist.	62
Number of diseased and in-contact animals destroyed	2,218

Total compensation allowed, $12,358.52.

In addition to the above we also dealt with an outbreak of hog cholera at Kenora, Ont., where the following number of premises and animals were dealt with:—

Number of premises inspected	21
Number of swine inspected	299
Number of premises on which the disease was found to exist.	7
Number of diseased and in-contact animals destroyed	163

Total compensation allowed, $873.99.

All the premises inspected were re-inspected at intervals covering a period of three months and special attention was directed towards having the premises upon which diseased animals had been kept cleansed and disinfected in a satisfactory manner.

MANGE OF HORSES.

This disease was found to be affecting horses in a certain district in the province, the source of infection being from a consignment of horses shipped from the province of Alberta. The affected and contact animals were placed under quarantine restrictions, and owners instructed as to the proper treatment of affected animals, as well also as the satisfactory cleansing and disinfection of premises.

Total number of horses inspected for mange	155
Total number of affected and contact animals quarantined	76

MANGE OF CATTLE.

The outbreak which was detected last year, affecting a number of cattle in the Portage-la-Prairie district, has been eradicated, and the premises upon which it had been in existence, have been re-inspected from time to time, without any further evidence of the disease having been detected.

In accordance with the requirements of the Mange Regulations, all cattle originating west of Winnipeg are required to be unloaded and inspected at Winnipeg. Cattle destined for points east of Winnipeg are only allowed to proceed after being carefully inspected and accompanied by the inspector's health certificate. Cattle showing manifestations of mange are not allowed to go forward but are detained here and are allowed to be removed from the yards under an inspector's certificate for immediate slaughter only.

During the past year, the following number of cattle were inspected at the Winnipeg stock-yards:—

Destined for points east of Winnipeg	32,203
For local consumption at Winnipeg	67,495
Total	99,698

* Of this number 224 were found to be affected with mange.

SUSPECTED SHEEP SCAB.

In accordance with the requirements of Ministerial Order No. 40, we inspected for scab 23,455 sheep imported from the United States, all of which appeared to be healthy. Of this number 226 were a consignment of breeding ewes, which were twice dipped in the official lime and sulphur dip, in the presence of an inspector. The remainder were for immediate slaughter only.

NECROBACILLOSIS—OR LIP AND LEG ULCERATION OF SHEEP.

During the month of December, 1911, it was reported to us that a number of sheep on premises at Glenlea, which had recently been shipped from Ontario, were affected with sores upon the mouth and feet, and, in company with Inspectors Hilton and Macintosh, I made an examination of the affected flock and found the lesions and symptoms to be characteristic of the condition known as necrobacillosis, or lip and leg ulceration of sheep. Swabs were taken from the sores on the affected animals and forwarded to the Biological Laboratory and a report was received from the pathologist, Dr. Higgins, to the effect that the disease was undoubtedly due to the bacillus necrophorus, which is the causative agent of the above affection of sheep.

Instructions were furnished owner as to the proper mode of treatment and precautions to be observed, with the result that the affected animals made good recovery.

One hundred and forty sheep were comprised in the flock, of which about 25 per cent were affected and showed well marked evidences of the disease.

DOURINE.

This disease has not been detected as affecting horses in this province. Three stallions which were reported as suspicious have been examined, but proved to be some benign affection and not dourine.

TUBERCULOSIS.

During the past year we have submitted to the tuberculin test one pure-bred heifer intended for export to the United States, which proved to be healthy.

I also submitted 38 head of cattle on the Brandon Experimental Farm to a first test, two of which re-acted and were permanently ear-marked, two being submitted to a second test. Two other animals, which were obtained to replace the two re-acting animals were also submitted to a first test.

There were also tested by practising veterinarians throughout the province, with tuberculin supplied by the Department, 112 head of cattle. Of this number 5 re-acted to the test and were officially ear-marked in accordance with the regulations, by regular officers of the Department.

TUBERCULOSIS STATISTICS FOR MANITOBA.

Cattle intended for Export to the United States.

One submitted to a first tuberculin test, which proved to be healthy.

Herds placed under the control of the Department.

Forty were submitted to a first tuberculin test.
Two were submitted to a second tuberculin test.

Two re-acted to a first tuberculin test, and were permanently ear-marked.

Cattle tested by Practicing Veterinarians with Tuberculin supplied by the Department.

One hundred and twelve submitted to a first test by practising veterinarians.
One submitted to a re-test by officers of this Branch.
Five re-acted and were ear-marked by officers of this Branch.

BLACKLEG.

This disease, which makes its appearance from time to time, is more or less indigenous to certain sections of the province, where it is reported affecting cattle. When the true nature of the disease is established, owners are advised to resort to vaccination of susceptible animals, their removal from infected pastures and the proper disposal of any carcasses of animals which have died from the disease.

Some mysterious disease affecting cattle was reported as causing considerable losses among cattle in the Woodlands districts, which was investigated and was found to be blackleg, and owners were advised as to the precautions to be observed.

During the past year we have supplied 225 doses of blackleg vaccine to owners for vaccination purposes.

INSPECTION OF LIVE STOCK CARS AND YARDS.

In accordance with the requirements of Ministerial Order No. 37, an inspector is stationed at the Winnipeg stockyards to supervise the cleansing and disinfection of all empty stock cars arriving at, or passing through, Winnipeg, unless bearing evidence of having been previously treated.

This work is conducted at the yards of the Canadian Pacific railway and the Canadian Northern railway.

	Cars.
At the Canadian Pacific railway yards there were cleansed and disinfected, under the supervision of our inspectors, during the year	4,021
At the Canadian Northern yards there were cleansed and disinfected, under the supervision of our inspectors, during the year	1,015
Total cars inspected	5,036

The stockyards at Winnipeg, and elsewhere throughout the province, were also ordered to be cleansed and disinfected, under the supervision of the inspectors, from time to time, as exigencies required.

ANIMALS QUARANTINE DIVISION.

The work of this Division consists in the enforcement and carrying out of the requirements of the regulations relating to animals quarantine, the animals quarantine stations and inspection ports in Manitoba being at Emerson, Gretna, Bannerman and Snowflake.

During the past year there has been a considerable increase in the number of animals entering and inspected at these various ports.

EMERSON QUARANTINE STATION.

This station is located at Emerson, on the International Boundary line, at the point where the Canadian Northern and Canadian Pacific lines of railway, and their American connections, intersect.

The equipment and accommodation at this point consists of a fenced enclosure, 205 feet in length by 100 feet wide, together with stable accommodation for 100 horses and cattle, and also covered-in shed used for the detention of swine during the required period of quarantine. The main stable is well lighted and thoroughly ventilated. There is also an inspector's office and waiting-room for the use of settlers during the time their stock is undergoing inspection.

Besides the inspector in charge, a caretaker is also maintained at this point, whose services are made use of in assisting the inspector and in keeping the yards and stables in good repair and cleanly condition, as well also as the cleansing and disinfection of the stables with limewash and carbolic acid, from time to time, as required.

During the past year there has been presented for entry and inspection at this station, the following number of animals:—

Horses, 11,626; mules, 1,372; cattle, 1,960; sheep, 15,271; goats, 4; swine, 57.

Fees collected, $3,325.26.

Two thousand nine hundred and eighty-nine horses and mules were submitted to the mallein test, of which 21 were submitted to a second test, and 3 re-acted and were refused entry.

Forty-three head of cattle were submitted to the tuberculin test, all of which proved to be healthy.

GRETNA QUARANTINE STATION.

This station is located at Gretna, on the international boundary line, conveniently situated between the Canadian Pacific railway and the Midland Branch of the Great Northern railway, each of which lines has a branch spur running into the quarantine station.

The equipment consists of a substantially fenced enclosure 140 feet in length by 120 feet wide; stable 100 feet by 30 feet, providing accommodation for 45 animals, and which is well lighted and thoroughly ventilated.

Besides the inspector in charge, there is also maintained a caretaker, whose services are made use of in assisting the inspector in charge, keeping the yards and stables in good repair and cleanly condition, as well also as the cleansing and disinfection of the stable with limewash and carbolic acid, from time to time, as required.

During the past year there has been presented for entry and inspection at this station, the following number of animals:—

Horses, 2,160; mules, 436; cattle, 425; sheep, 228; goats, nil; swine, 1

Fees collected, $599.01.

Seven hundred and thirty-six horses and mules were submitted to the mallein test of which two were submitted to a second test, and 1 re-acted and was refused entry. One horse which had previously been presented and had re-acted to the mallein test, was slaughtered upon being again presented by the owner, for entry.

Two head of cattle were submitted to the tuberculin test and proved to be healthy.

BANNERMAN QUARANTINE STATION.

This station is situated on the B. S. & H. B. Branch of the Great Northern line of railway at Bannerman, and is distant from the international boundary line about three and a half miles.

The equipment consists of a substantially fenced enclosure, 140 feet in length, by 120 feet wide; stable 100 feet by 30 feet, providing accommodation for 45 animals. The stable is well lighted and thoroughly ventilated.

During the past year there has been presented for entry and inspection, the following number of animals:—

Horses, 499; mules, 11; cattle, 104; sheep, 1; goats, 1; swine, 1.

Fees collected, $134.40.

One hundred and ninety-three horses and mules were submitted to a first mallein test, of which 5 were submitted to a second test, and 7 re-acted and were refused entry.

SNOWFLAKE INSPECTION PORT.

Snowflake, which is an inspection port only, is located on the Snowflake branch of the Canadian Pacific railway, distant about three miles from the international boundary line. The Department has rented a stable at this point, which provides

accommodation for about 25 animals, and, up to the present, this has been sufficient to meet requirements.

During the past year there has been presented for entry and inspection at Snowflake, the following number of animals:—

Horses, 178; mules, 8; cattle, 61.

Fees collected, $32.

One hundred and sixty-eight horses and mules were submitted to a first mallein test, and all proved to be healthy.

During the past year 2 head of oxen were also inspected at Sprague, which had been imported for work purposes, and fees amounting to $1.50 were collected thereon.

SUMMARY, showing total number of animals presented for entry and inspection, and submitted to the mallein and tuberculin tests, at the various quarantine stations and inspection port in Manitoba:—

Horses and mules inspected	16,290
Horses and mules sumbitted to a first mallein test	4,086
Horses and mules submitted to a second mallein test	28
Horses and mules which re-acted and were refused entry	11
Cattle inspected	2,552
Cattle submitted to the tuberculin test	45
Sheep inspected	15,500
Goats inspected	5
Swine inspected	59
Fees collected	$4,092 17

EXAMINATION OF THOROUGHBRED STALLIONS.

During the past year, I have, on instructions received from you, made an examination for soundness of the following thoroughbred stallions, standing for service:—

'KID'—315—Born 1907, owned by the Canadian National Bureau of Breeding, Ltd., Montreal, in charge of H. L. Flett, Binscarth, Man.

'ORACULUM'—137—Born 1904, owned by the Canadian National Bureau of Breeding, Ltd., Montreal, registered in the name of J. F. Ryan, Montreal, in charge of Baron de la Rue du Can, St. Rose du Lac, Man.

'EDWIN GUM'—181—Born 1903, owned by the Canadian National Bureau of Breeding, Ltd., Montreal; registered in the name of Wm. Walker, Toronto, Ont., in charge of Dr. J. P. Molloy, M.P., Morris, Man.

'VANCE GUARD'—166—Born 1907, owned by the Canadian National Bureau of Breeding, Ltd., Montreal, registered in the name of J. F. Ryan, Montreal, in charge of R. C. Cochran, Oak River, Man.

'LORICATE'—284—Born 1901, owned by the Canadian National Bureau of Breeding, Ltd., Montreal, in charge of Glen Campbell, Dauphin, Man.

'SENATOR CLAY—183—Born 1904, owned by the Canadian National Bureau of Breeding, Ltd., Montreal, registered in the name of J. F. Ryan, Montreal, in charge of Thos. McNutt, M.P., Saltcoats, Sask.

'WILD GRASS'—177—Born 1908, owned by Hutch, Harkness, Dauphin, Man.

MEAT INSPECTION DIVISION.

The work in connection with this Division is carried out by specially qualified inspectors trained in the work of meat inspection, and whose duties consist in the carrying out of the various requirements of the Meat and Canned Foods Act and the regulations relating thereto,at certain packing plants in the city of Winnipeg, viz:—

The Swift Canadian Co., known as Establishment No. 18.
Messrs. Gordon, Ironsides & Fares, known as Establishment No. 19.
Messrs. Gallagher, Holman & LaFrance, known as Establishment No. 20.
The Western Packing Co., known as Establishment No. 21.

At each of these establishments a sufficient number of veterinary inspectors has been maintained to carry out the actual work of technical inspection of all animals both before and after slaughter, and, in this connection, during the greater part of the year, about twelve inspectors have been actively engaged in carrying out this work. During the latter part of the year this force was supplemented by the addition of three lay inspectors, to carry on work other than the actual technical inspection of animals slaughtered. Thus not only is a close inspection made of all animals slaughtered, but a close supervision is exercised over the further preparation of all meat and meat food products and the proper labelling thereof.

All of which is respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

C. D. McGILVRAY,
Inspector.

The Veterinary Director General,
Department of Agriculture,
Ottawa.

APPENDIX No. 5.

D. S. Tamblyn, D.V.S.

Regina, Sask., March 31, 1912.

Sir,—I have the honour to submit herewith my annual report for the fiscal year ending March 31, 1912, for the province of Saskatchewan.

The work performed by the officers of the Health of Animals Branch of the Department of Agriculture is as follows:—

GLANDERS.

The eradication of glanders in the province of Saskatchewan is certainly a most serious question. This disease during the past two years has shown a considerable increase in spite of the stringent measures brought about to eradicate it. One of the most remarkable features in dealing with glanders during the past year, was the large number of clinical cases destroyed compared with those of the previous year. The policy adhered to in dealing with this disease, was that of dealing with all reported outbreaks, and the tracing of all direct contacts. This you agreed with me when at Ottawa last November, was the only satisfactory system to follow if glanders was to be brought under control in this province. I am fully aware of the difficulties surrounding the testing of contact animals, and I have continuously impressed upon the inspectors under my charge, that the utmost discretion should be used in selecting contacts when dealing with outbreaks of this disease. In this connection no hard and fast rule has been laid down, as it is next to impossible to draw the line as to which animals reported to our officers by the owners of diseased stock, are the real contacts, and which are not. While the following out of the policy of tracing all contact animals means an enormous amount of work and more assistance, nevertheless the work performed is efficient and not perfunctory.

The testing of range horses in the Maple Creek dtistrict during the past summer was completed with satisfactory results both to the owners and this Department.

The work performed by our officers in the Wood Mountain district was effective, and the employment of Range Rider Decock for the purpose of keeping the animals already tested, isolated from the range animals, was accepted by those who had their horses tested with a great deal of satisfaction and appreciation. There are still quite a number of bands listed which will be dealt with if possible this summer. The testing of range horses appears to me to be of the utmost importance, especially after our experience in the above mentioned districts. Had the testing of range horses in the district referred to, not been carried into effect, the majority of the animals destroyed would have this year been distributed to all parts of the province, especially in the case of the Ogle ranch, as I understand that the horses on this ranch have nearly all been disposed of. It will be remembered that our officers dealt with numerous outbreaks which were traced to animals which carried the Ogle brand, which is ipso facto evidence of the great risk [illegible] running in not insisting upon the compulsory testing of all range horses and mules.

A number of trips were made by me during the year to different parts of the province in connection with glanders. The results of their findings, together with the report of Dr. McGilvray, were communicated to your office.

FIELD TESTS.

Total number of animals submitted to 1st mallein test	13,167
Total number of animals submitted to 2nd mallein test	4,147
Total number of animals submitted to 3rd mallein test	900
Total number of animals submitted to 4th mallein test	66

Total number of animals destroyed, 722; clinical cases, 242.
Total value of animals destroyed, $98,615.
Total compnsation, animals destroyed, $65,743.33.

Out of the above number of horses destroyed, twenty-two (22) were imports, valued at, $3,295. No compensation.

Two horses included above as being destroyed were native horses, valued at, $230. Compensation on these animals was withheld pending the action and decision of the Minister.

HOG CHOLERA.

In connection with Hog Cholera, I would say that the officers of this Branch dealt with a number of outbreaks in the districts of Swift Current and Saskatoon. Seven premises were placed under quarantine for this disease.

Total number of animals inspected	474
Total number of animals destroyed	158

Valuation, $1,461; compensation, $974.

Number of animals died previous to inspection	124
Number of hogs found healthy and slaughtered for human consumption	75

One hundred and seventeen (117) hogs quarantined on suspicion were released, having been found healthy.

The history of each outbreak tends to prove that the infection was brought about through the feeding of swill obtained from hotels. The stringent measures enforced by our officers quickly brought this disease under control, and no premises remain at present under quarantine on account of this malady.

HORSE MANGE.

During the past fiscal year the number of outbreaks of Horse Mange showed a slight decrease, seventy-one (71) premises being placed under quarantine.

Total number of horses inspected and quarantined for Mange during the year	455
Total number of horses affected	102

I may also state that these animals have been reinspected from time to time by the officers of this department, and that 383 have been released from quarantine.

BLACK QUARTER.

This disease made its appearance in different parts of the province during the past year, and from the number of applications received for Black Leg Vaccine, it is apparent that this disease is somewhat on the increase. However, information and advice from a preventive point of view were issued from this office to the farmers who applied for vaccine. In two different outbreaks our officers were detailed to investigate same owing to the disease having been reported to this office as Anthrax, the results of these investigations proving negative.

RABIES.

This disease was reported in the vicinity of Lloydminster and investigated by Inspector Head, with negative results.

DOURINE.

I regret to report that this disease made its appearance in two different districts during the past year. One outbreak occurred at Milestone, while the other made its appearance in the vicinity north of Unity.

In the Milestone outbreak the history tends to show that the source of infection was due to a consignment of stallions and mares imported from the State of Iowa, U.S.A. Inspector Hargrave, who was requested by you to investigate this outbreak, had no hesitation in diagnosing it as Maladie du Coït, and at your direction the majority of the inspectors of this province were given the opportunity of examining these cases which were typical of Dourine. Dr. Hargrave continued his investigations in the Unity outbreak, accompanied by Inspectors Olsen, W. L. Hawke and myself, and while the animals in this outbreak did not exhibit such marked symptoms as those in the Milestone outbreak, Dr. Hargrave came to the conclusion that the animals were affected, but in a very mild form. It was considered advisable, however, to postpone any action until such time as the services of the Assistant Pathologist, Dr. A. Watson, were available, when a serological test could be conducted and the affection positively diagnosed.

MALADIE DU COIT.

Number of animals slaughtered	5
Value	$1,050 00
Compensation	$500 00
Number of animals suspected and quarantined	120

SHEEP SCAB.

This disease did not make its appearance in the province, but following your instructions to the effect that all sheep in the districts of Crane Lake and Maple Creek were to be inspected, owing to sheep scab being detected in the abattoir at Winnipeg, an officer of this branch was detailed to the above district with a view of carrying out your wishes in this respect.

Total number of sheep inspected, 33,950, all of which were free from disease.

The officers of this branch also superintended the shipping of 21,444 sheep imported for immediate slaughter, which animals were allowed to proceed from the port of Wood Mountain to Morse, Sask., for shipment to different abattoirs in the provinces of Saskatchewan and Manitoba.

These measures were necessary to prevent them from coming in contact with Canadian sheep, or being disposed of by the importers for other purposes.

Nine hundred (900) import sheep and four hundred and fifty-two (452) lambs were quarantined on the premises of D. J. White at Little Woody, Sask. These animals were released at the termination of thirty (30) days, being found free from scab.

TUBERCULOSIS.

This office has been called upon to supply tuberculin to a number of private practitioners at the request of owners, for the purpose of submitting their cattle to the tuberculin test.

One hundred and twenty-seven (127) cattle were submitted to first test, seventy-two (72) by private practitioners, and fifty-five (55) by the officers of this Department, thirty-nine (39) of the latter number being the cattle of the Experimental

Farm at Indian Head. The number of cattle retested by our officers during the past year was 2, while 8 head were ear-marked.

INSPECTION STOCK YARDS AND STOCK CARS.

This work has been carried out in a more practical manner during the past year by the railway companies in this province, and the difficulties experienced by our officers at Moosejaw last year in compelling the Canadian Pacific Railway Company to live up to the regulations in this respect, has been overcome, which goes to show a certain amount of increased efficiency in connection with this work.

FIELD OFFICERS MOVEMENTS.

The following officers were added to the Saskatchewan staff during the past year:—Messrs. McLeish, Monroe, Blackwood, Hawke, Colebourn and Aikenhead. The last-named officer resigned his appointment on December 1, 1911, while Inspectors Colebourn and Monroe were transferred to the Meat Inspection Division in other provinces.

Inspector J. H. George was detailed to work in this province for a short period, after which he returned to the Meat Inspection Division.

Inspector H. W. Mustard was transferred to Calgary.

The procuring of a satisfactory clerk for the Regina office has been a source of trouble, especially when taking into consideration the enormous amount of clerical work dealt with at certain periods of the year. Mr. Mannsell, who succeeded Mr. O'Connell, resigned his appointment on August 20, 1911, and was succeeded by Mr. E. Brewis, who is, I am pleased to say, fairly well conversant with the work of the Department, while Miss Creswell, the stenographer, is also deserving of a considerable amount of praise for the manner in which she has conducted her share of the work.

However, I think that the time has arrived when the staff should be increased by the addition of a Veterinary Inspector, which will permit my devoting more attention to field work, which I may say is of the utmost importance in supervising the work of a department of this nature, whereas at present I find it impossible to leave the office for any length of time owing to pressure of work.

BOUNDARY INSPECTIONS.

In connection with boundary import work in this province, I beg to state that the work required detailing Inspectors McMurtry, George and Poole to the port of North Portal during the rush of immigration. The completion of the water system at that point for the accommodation of settlers and importers of stock in general, is being greatly appreciated, and what with other minor improvements, it tends to greatly increase the efficiency of the work of this Department. Inspector Chester, who was transferred to British Columbia owing to ill health, was succeeded by Inspector M. Barker, which officer has shown considerable interest in the work allotted to him.

The construction of new stables at Willow Creek, which were completed early in the year, greatly increased the facilities at that point. The services of Inspector Lesperance, who was in charge of Willow Creek for some months, were dispensed with by order in council under date of January 20, 1912. This port has since been in charge of Inspector H. L. Dixon.

Inspector Acres, the officer in charge at Marienthal, was transferred to Grand Forks, B.C., and was succeeded by Inspector E. A. Meakings on February 21, the latter officer being re-engaged by this Department.

Relative to the facilities at Marienthal, Big Muddy and Wood Mountain, I would recommend that just as soon as the railway construction work is completed along the international boundary line, stables and corrals be built.

I would also recommend the building of six-room houses for the accommodation of our officers at all boundary ports. This will have beneficial effects in the way of keeping them more permanently at these points.

NORTH PORTAL QUARANTINE STATION.

The following figures show the number of animals presented for entry and inspection at the port of North Portal during the past fiscal year:—

Horses.	Mules.	Cattle.	Sheep.	Swine.	Goats.	Asses.	Fees Collected.
13,976 (290)	1,166 (3)	5,377 (602)	231 (3)	17	8	6	$3,604.42

Two thousand eight hundred and forty-one horses and mules were submitted to 1st mallein test.

Three hundred and forty-eight were submitted to 2nd mallein test.

Thirty-two to 3rd mallein test.

One hundred and seventy-one horses and mules reacted and were refused admission.

Eleven thousand and thirty-two were accompanied by B. A. I. charts.

Eleven horses were rejected for mange, and 13 allowed to proceed to destination under license, there to remain isolated until re-tested and released by our officers.

WOOD MOUNTAIN QUARANTINE STATION.

The following figures show the number of animals presented for entry and inspection at this port during the past fiscal year:

Horses.	Mules.	Cattle.	Sheep.	Swine.	Goats.	Asses.	Fees Collected.
1,118 (76)	24	2	21,444 (452)	.....	8 (2)	.....	$985.60

Seven hundred and seventy-four horses and mules were submitted to the 1st mallein test and 15 to 2nd test. Six reacted and were permanently rejected.

Thirty-one horses accompanied by B. A. I. charts.

BIG MUDDY QUARANTINE STATION.

The following figures show the number of animals presented for entry and inspection at the port of Big Muddy during the past fiscal year:—

Horses.	Mules.	Cattle.	Sheep.	Swine.	Goats.	Asses.	Fees Collected.
880	12	59	1	.....	.....	.....	$301.50

Two hundred and fifty-five (255) horses were submitted to the 1st mallein test, and ten to the second. Ten horses and mules reacted and were rejected.

One hundred and ninety (190) horses and mules were accompanied by B. A. I. mallein test charts.

WILLOW CREEK QUARANTINE STATION.

The following figures show the number of animals presented for entry and inspection at the port of Willow Creek during the past fiscal year:—

Horses.	Mules.	Cattle.	Sheep.	Swine.	Goats.	Asses.	Fees Collected.
1,344 (126)	64	26	12,700	.....	.. ..	1	$762.00

Five hundred and ninety-two (592) horses and mules were submitted to 1st mallein test, seventy-four (74) to 2nd, twelve (12) reacted and were rejected.

Seven hundred and forty-seven (747) horses and mules accompanied by B. A. I. mallein test charts.

One hundred and twenty-nine (129) horses and mules allowed to proceed on license to destination.

MARIENTHAL (Inspection Port).

The following figures show the number of animals presented for entry and inspection at this port during the past fiscal year:—

Horses.	Mules.	Cattle.	Sheep.	Swine.	Goats.	Asses.	Fees Collected.
846 (64)	21	250 (41)	1 (2)	.....	.....	.....	$291.10

Six hundred and sixty-eight (668) horses and mules were submitted to 1st test, one to 2nd test. Nine (9) reacted and were rejected. One hundred and thirty-four (134) were accompanied by B. A. I. mallein test charts.

The following is a summary showing the total number of animals presented for entry and inspection, and the number of mallein tests conducted at the various quarantine and inspection ports in the province of Saskatchewan.

Horses and mules inspected	19,451	(559)
Horses and mules submitted to 1st mallein test	5,130	
Horses and mules submitted to 2nd mallein test	478	
Horses and mules submitted to 3rd mallein test	32	
Horses and mules reacted and rejected	208	
Cattle inspected	5,714	(643)
Sheep inspected	34,377	(457)
Goats inspected	16	(2)
Swine inspected	17	
Asses inspected	7	
Total amount of fees collected	$5,944.62	

I have the honour to be, sir,

Your obedient servant,

D. TAMBLYN,

Inspector.

The Veterinary Director General,
Ottawa, Ont.

APPENDIX No. 6.

J. C. Hargrave, D.V.S.

Dominion of Canada,

Medicine Hat, August 12, 1912.

Sir,—I have the honour to submit herewith my annual report for the province of Alberta, south-eastern British Columbia and a portion of south-western Saskatchewan, for the year ending March 31, 1912.

I find it again necessary to report that during that period your inspectors within the area mentioned have at all times been actively engaged dealing with the various contagious and infectious diseases as are found and have been for some time prevalent in that territory. It is possible that the major portion of the time of the inspectors has been taken up dealing with the mange situation within the area covered by the special order relating thereto within the southern portion of Alberta and the south-western portion of Saskatchewan. In dealing with and endeavouring to control this disease, a great deal of attention on the part of the inspector is necessary and often resulting in very little to be shown for the efforts made.

While the situation generally speaking is somewhat better than that reported a year ago, yet there is much left to be desired, but, were it not for the antipathy that continues yet to be exhibited towards the efforts put forward by your inspectors, such would possibly not be the case, as in possibly every sub-district there are yet to be found individuals who deem the prerogative of the Department an interference that they do not care to tolerate, and one frequently finds that the efforts made by such individuals, in compliance with such orders as have been issued by your inspectors in compliance with the regulations, are perfunctory in the extreme.

During the year I inspected shipments of live stock to points outside of the province of Alberta as follows:—

Horses	1,141
Mules	3
Cattle	343
	(calves 121)

MALADIE DU COIT.

While the number of cases of this disease during the year have not been so great as last year, yet we have had a recurrence of the disease in a territory in which we thought the disease had been cleaned up, which only illustrates the fact that there are cases of this disease which progress very insidiously and exhibit symptoms that even to the expert are not discernible, and also demonstrates the necessity of maintaining quarantines for a considerable length of time, as pointed out in previous annual reports. Even after the greatest endeavour has been made, often it is difficult and very often impossible to determine the source of infection of the various outbreaks.

During the latter part of the year, Dr. Watson, our pathologist, who has devoted considerable time to the work on this disease, was granted a lengthy leave of absence to afford him an opportunity of visiting the laboratories in England and Germany with a view to comparing the disease in this country with the same disease as exists in European countries, and it is to be hoped that the knowledge gained through such privilege will prove to be of benefit to the Department, particularly in the eradication of this disease from the western provinces.

Statistics for Alberta:—	
Number slaughtered	13
Value (including one reg. animal)	$1,760 00
Compensation (including one reg. animal)	$1,173 33
Number suspected and quarantined	89
Statistics for Saskatchewan:—	
Number slaughtered	5
Value (including 2 purebreds)	$1,000 00
Compensation (including 2 purebreds)	$700 00
Number suspected and quarantined	112

The above figures would indicate that throughout the province of Alberta a considerable less number of horses were infected than during the previous year, although the disease had been introduced into the province of Saskatchewan. In this province two outbreaks were detected, one in the northern portion, the source of origin of which could not be determined; the other in the southern portion of the province which, from the history obtained, beyond the question of a doubt originated through the importation of an infected horse brought from the State of Iowa, but a considerable period elapsed before the outbreak in question was located. We, however, got the situation under control without finding any great number of contact animals, of which contact animals some four (4) head only have so far exhibited symptoms of the disease.

GLANDERS.

While a year ago I reported the number of cases detected to be few in comparison with the year previous, yet this year your inspectors have slaughtered a number slightly larger than last year, and from the history obtained in each outbreak, and the fact that the various outbreaks were scattered throughout the province, convinces one that there is yet a considerable amount of this disease within the province.

When one realizes that we as yet have only some two or three Inspectors in the northern half of the province, through which area there are to be found a large number of settlers that have immigrated from the United States as well as other provinces within the Dominion, it is only reasonable to expect that we shall sooner or later find centres of infection, and I think possibly that, particularly during the summer months, the services of an additional Inspector or two could be used to advantage if for no other purpose than a general inspection of live stock in that portion of the province referred to.

GLANDERS STATISTICS FOR BRITISH COLUMBIA.

(Crowsnest District.)

Native horses slaughtered	1
Value	$60 00
Compensation	$40 00
Native horses (returning from U.S.) tested once	14
Native horses (returning from the U.S.) tested twice	13

GLANDERS STATISTICS FOR ALBERTA.

Native horses tested once	2,039
" " " twice	248
" " " thrice	8
Ceased re-actors re-tested	1
Native horses slaughtered on 1st test	41
Native horses slaughtered on 2nd test	4

Total value, $6,950; compensation, $4,633.32.
Of the number slaughtered twenty (20) head presented clinical symptoms.

Import horses tested once	52
Import horses tested twice	15
Settler's horses seized by Customs, tested and sold and fees collected	2
Fees	$1 75

In addition to which fees on Customs seizures of horses amounting to 66 head were collected totalling $46.25, of which number twelve (12) head were tested, the balance were tested at the boundary, at which point they were given a settler's entry and afterwards were seized by the Customs Department, as the entry at Coutts was found to be fraudulent.

SASKATCHEWAN.

Native horses tested once	139
" " " twice	26
" " " thrice	6
" " " four times	6
" " slaughtered on first test	3
Value	$450 00
Compensation	$300 00
Import horses tested once	402

HORSE MANGE.

Were it not for an outbreak of this disease amongst horses found by Inspector Cawsey in the Hardisty district I would be able to report this province practically free from the disease. The outbreak in question, however, was energetically dealt with, and I believe ere long it will be my privilege to report the eradication of this disease in the province.

CATTLE MANGE.

This disease I am afraid we are to have with us always, although the figures would indicate that it is gradually being confined to smaller areas. This is due no doubt to the fact that the ranching areas have been curtailed to a considerable extent. The farmers having taken up large tracts of what was formerly open range and fencing them in small areas has prevented very largely the drifting of cattle from one district to another, with the result that once we free certain districts of the disease there is not the same liability of re-infection, and it is possible that within a few years the disease may be eradicated.

Statistics for the past year:—

HORSE MANGE.

Number of premises dealt with	36
" " horses quarantined	477
" " " presenting symptoms of mange	78

CATTLE MANGE—ALBERTA.

Number of herds quarantined	441
" " cattle "	116,690
" " " dipped twice	89,022
" " " " once	106,527
" " " hand treated	1,068

CATTLE MANGE.—SASKATCHEWAN.

Number of herds quarantined	79
" " cattle "	16,608
" " " dipped twice	17,595
" " " " once	18,945
" " " hand treated	297

TUBERCULOSIS.

Tuberculin test was applied to 33 head of cattle by private veterinarians with tuberculin supplied through this office. Of these three reacted, and were so dealt with and two gave a suspicious re-action.

BLACK QUARTER.

Sales of Blackleg Vaccine amounting to $62.60 were made during the year. This, however, does not represent amount of vaccine sold throughout the province, as a large number of sales were made by druggists in the various cities and towns, who keep a supply on hand.

RABIES.

It is gratifying indeed to be able to advise you that, since the outbreak successfully dealt with in the Red Deer district some time ago, there has been no further evidence of this disease within the province. Practically eighteen months have elapsed since the quarantine placed in connection with that outbreak was terminated.

HOG CHOLERA.

This disease has continued to make its appearance throughout the southern part of the province, and I think can in almost every instance be attributed to the feeding of uncooked garbage, although in one or two outbreaks the disease was carried from infected premises to those adjoining. Stringent measures were, however, adopted in each case and no further cases in each particular district have occurred.

Number of premises dealt with during the year	24
Number of diseased hogs slaughtered	316

Value, $2,258.20. Compensation, $1,505.45.

In addition to the above 355 hogs were slaughtered and found fit for consumption.

BOUNDARY STATIONS.

The number of quarantine stations under the jurisdiction of this office is 5. Two of these are located in the southeastern portion of British Columbia and at each port a regular officer is located. No improvements have been added to any of them during the past year.

Pendant d'Oreille.

Entries at this Port:—

Horses, 497; mules, 1; cattle, 5; sheep, 12,174.

Number of re-actors (returned to U.S.), 1; contacts, 3.

Coutts.

Entries at this port:—

Horses, 2,981; mules, 118; cattle, 40; sheep, 32,870; swine 7; goats, 48.

Number of re-actors, nil.

Twin Lakes.

Entries at this Port:—

Horses, 1,249, (foals 190); mules, 2; sheep, 810.

Number of reactors (returned to U.S.), 1; contacts 5.

Gateway.

Entries at this Port:—

Horses, 250; mules, 26; cattle, 9; buffalo, 15.

Number of reactors (returned to U.S.), 2; contacts 16, three of which were returned to the United States, thirteen (13) of which were admitted and retested at destination.

Kingsgate.

Entries at this Port:—

Horses, 2,754 (foals 102); mules, 96; cattle, 166; sheep, 8; buffalo, 7; elk, 7.

Number of re-actors, nil.

Total inspections of stock shipments from within the infected area to points outside of the province of Alberta, as follows:—

Horses and mules, 9,909; cattle, 40,284.

In addition to the above a very large number of different classes of stock have been inspected by your inspectors for shipment from one point to another within the area taking a great amount of time and careful attention.

I have the honour to be, sir,

Your obedient servant,

J. C. HARGRAVE,

Inspector.

To the Veterinary Director General,
Ottawa, Ont.

APPENDIX No. 7.

ANNUAL REPORT

S. F. Tolmie, V.S.

Victoria, B.C., March 31, 1912.

Sir,—I have the honour to submit my annual report for the year ending March 31, 1912.

Boundary Inspection.

Boundary inspection is steadily increasing in this province. During the year just ended 4,266 horses, 202 mules, 547 cattle, 75,777 sheep, 70 colts, 64 calves, 1,094 goats and 18 swine were inspected. Sixty-eight horses and one cow were rejected. Twenty-six cattle were tested with tuberculin for export to the United States. One cow re-acted and was destroyed.

$4,631.18 in fees were collected.

With the exception of Rykerts all the ports on the boundary are provided with suitable stable accommodation for inspection work. This greatly facilitates the operations of your inspectors. New stables are now being completed at Vancouver, White Rock and Keremeos.

Contagious Diseases.

It is pleasing to note that no serious fresh outbreaks of contagious disease have occurred. But little glanders has been encountered. Fifty-five local horses were tested with mallein; six re-actors destroyed and $540 in compensation paid.

Only two outbreaks of hog cholera have occurred. Total number of swine died, 68; slaughtered, 58, and $342 compensation paid. This is very satisfactory after our experience of some previous years when the losses from these two diseases were quite heavy.

In the area quarantined for cattle mange at Kamloops, work has been progressing steadily with a view to eradicating the disease.

The inspectors on the ground in charge of this work have had many difficulties to contend with, due to the broken and partially timbered condition of the country, making it difficult to secure a clean gather of the cattle at a season of the year when dipping is practicable. Owing to the fact that the disease had not made much progress when first discovered, many of the stockmen interested do not seem to realize the serious losses that will be experienced in the event of mange gaining a good foothold and some do not show a disposition to use remedial and preventative measures with that energy which the circumstances require. I am sure that if they were to combine and co-operate heartily with the inspectors in charge, the district could be cleaned up in short order.

Reports show, however, that satisfactory progress has been made under the circumstances, and mangy cattle are not now nearly so much in evidence as they were when the work was first taken up.

I am glad to report that neither dourine nor sheep scab are to be found in this province.

The Red Water investigation is being continued by Assistant Pathologist Hadwen. He has been provided with suitable equipment at the Agassiz Experimental

Farm, and he is now conducting a number of experiments in connection with the disease that should prove of great value.

A number of reports of suspected contagious disease have been investigated from time to time, but in many instances the animals were found to be suffering from diseases not covered by the Animals Contagious Diseases Act.

The practice of feeding uncooked swill to swine is quite prevalent in this province. Many of the feeders do not recogize the danger in following this practice. As you are aware many of our outbreaks of hog cholera in British Columbia are attributed to this cause. The remedy seems to lie in the education of swine owners regarding the dangers of raw swill. This could be done by issuing a bulletin giving full information on the subject or by carrying on a campaign of education through the medium of the Farmers' Institutes.

The inspection of stock cars has been more rigidly enforced than ever. 2,658 stock cars were cleansed and disinfected under the supervision of your inspectors. Public stock yards are maintained in a fairly satisfactory condition and when reported or found unsatisfactory prompt measures are taken to have the conditions remedied.

I have the honour to be, sir,

Your obedient servant,

S. F. TOLMIE,
Inspector.

The Veterinary Director General,
Ottawa, Ont.

APPENDIX No. 8.

C. H. Higgins, B.Sc., D.V.S., F.R.M.S., Pathologist.

Ottawa, March 30, 1912.

Sir,—I have the honour to transmit this my annual report as Pathologist to the Department for the year just ended.

The technical staff of the laboratory during the year has included besides myself, Drs. Wickware, Evans and Reid. Dr. Evans was sent by you in October last to Lethbridge for the purpose of relieving Dr. Watson during a temporary absence of a few months, and returned to the laboratory on March 28. Dr. Reid, whom you directed to report to the laboratory on July 12 last, has been attached to the staff since that time. Dr. Wickware has been on duty at the laboratory during the entire year. The lay assistants comprise Mr. Fee, the caretaker, who has occupied that position for a number of years, and Mr. A. Abraham, temporarily attached.

Drs. Wickware, Evans and Reid have shown great interest in their respective duties, and have also rendered valuable assistance in the conduct of the work of the laboratory. As instanced in my report of last year, the *esprit de corps* has been excellent among the members of my staff, and the specialization of each individual along certain specified lines has simplified the method of completing in the shortest possible time any investigation with which we may have been confronted. Each has given special attention to some particular feature of the work, yet all have been given the opportunity of familiarizing themselves with the progress of any special work that may have been the subject of investigation. As the work increases, it will be necessary to develop each assistant along more highly specialized lines in order to meet the many new problems which are continually confronting us from time to time.

Some attention has been given to original research, but our efforts in this connection have not been as productive of results as one would wish on account of the time available in this effort, which has been very limited.

Many valuable specimens have been received during the year, and minor studies have been commenced in a number of instances which I hope that we may be able to prepare and issue in the form of special circulars or bulletins for distribution among interested parties. The material which can be utilized with profit for advanced studies has been laid aside pending a time when we can systematically take up its detailed consideration and bearing on practical problems connected with the work of the branch as a whole. During the year we have dealt with 720 series of specimens as compared with 423 series for the year preceding.

A very wide variety of specimens is included in the above. Those received from inspectors of the Meat Inspection Division, have, as a rule, been forwarded for the purpose of establishing a diagnosis and the passing of a judgment. The specimens from other sources have been forwarded for general diagnostic purposes with a request for assistance to combat the affection. Many of these latter have dealt with problems associated with the poultry interests, some of which are of vital importance. In all instances it has been our endeavour to meet the exigencies of the case in hand with the least possible delay. The increasing occurrence of affections of a parasitic origin points to the desirability of having a member of the laboratory staff devote himself to such problems in a manner that has heretofore been impossible. In a number of instances parasitic infestations have been found upon which we have no

literature, and to which we have been unable to find reference. These require further study before we can hope to offer intelligent advice for their control.

I regret that the much needed addition to the laboratory building is not yet available for our use, and it is to be hoped that this may be proceeded with at an early date, as it will enable us to conduct our work with greater facility and less danger than is at present possible. We found ourselves greatly crowded a year ago, and this crowding has become more acute, much of our work suffering in consequence.

Without further dilating upon the general features connected with the work of the laboratory, I will deal with a number of special subjects which are important considerations, not only from the laboratory view point, but, of the branch as a whole.

INCREASED ACCOMMODATION.

The need for increased accommodation is at present more urgent than at any time during the past four years. All of our available space is being made use of, and, at times we are so greatly crowded that the danger to individuals is greater than it should be. It has been my aim, in the conduct of the work of the laboratory, to eliminate, as far as possible, the danger of infection to individual workers. This, however, is largely dependent upon the laboratory facilities. At the present moment, we require an increased amount of room for our various duties in order that the hazard to individuals may be decreased.

While an increase in accommodation is necessary in connection with the routine and special laboratory work, it is desirable that we should be in a position to adequately justify, from an experimental standpoint, any ruling which it may be necessary for us to make. We should also be able to consider experimental work of an advanced nature in connection with diseases which the branch is endeavouring to control, not only in an endeavour to ensure accurate diagnoses, but to enable us to base any opinion on sound experimental data.

There is a necessity for us to increase the ordinary accommodation required for our small experimental animals. These small animals, which are a necessity in contion with any experimental work are difficult to secure, and we are, therefore, forced to breed what we require for our own use. There seems to be a general shortage of small animals among scientific institutions, a result of improved methods of diagnosis. In all probability no single experimental method of diagnosis has contributed to this shortage to such a degree as the Wasserman reaction for the diagnosis of syphilis in the human being. As a similar method of diagnosis is being experimented with by us for the diagnosis of certain diseases in animals, we should so enlarge our accommodation as to provide a suitable supply for this work. These small animals cannot be purchased when required, and in securing them from indiscriminate sources we jeopardize our stock through the danger of introducing an infectious disease.

Our present accommodation does not provide adequate space for this purpose, nor are our storage facilities satisfactory for supplying the most suitable food for keeping them in a high state of health during the late winter and early spring months, with the result that we are entirely dependent on accidental sources for our food supply at this time of the year. A suitable root cellar in connection with a commodious building for their housing will meet our requirements.

BIOLOGICAL PRODUCTS.

The manufacture of biological products has been maintained throughout the year without interruption and their quality, as indicated by our laboratory and other tests, has been satisfatory.

We are of the opinion that all such products for use in connection with the detection of disease in animals or designed as preventive or curative agencies should comply with certain standards. Aside from the products manufactured at this labo-

ratory, there is no supervision, either as regards purity or potency of material, manufactured for similar purposes, designed for use in Canada. Further, there is no means of determining the amount of the importation of such products as tuberculin and mallein, for the general testing of cattle and horses. Such testing may be done, either to determine the existence of disease, or to nullify the results of a properly conducted examination with these agencies, under competent supervision. The commercial firms supplying these products in the past have exhibited a high degree of integrity, with the result that few errors have occurred. We should, however, be prepared for the emergency by establishing a suitable standard for each product and conduct such experiments as may be deemed necessary to see that such a standard is maintained.

The increasing use of biological products for the treatment and prevention of disease, confronts us with the possibility of the introduction of a serious contagious malady, consequently, all of these preparations should be subjected to the most rigid scrutiny before their use is allowed. This scrutiny should include, not only an examination of the finished product, but a careful inspection of the premises where they are manufactured, that the suitability of the plant may properly be passed upon. Such a course will prove an additional insurance of the live stock of the country against accidental losses from preventable contagious disease.

The passage of a bill along the lines of that forwarded to you for consideration in May last would meet the danger which is above indicated.

The details connected with our manufactured products are as follows:—

MALLEIN.

As formerly, this product has consumed more of our time than that of the others with whose manufacture we have been charged. In this connection it may be in order to state that the electrically heated incubator which we use for the manufacture of this product is giving satisfaction and requires no attention whatever to keep it in proper order at the requisite temperature.

The disbursements for the past five years have been as follows:—

—	1907-08.	1808-09.	1909-10.	1910-11.	1911-12.
April	1,750	3,861	2,905	9,041	295
May	1,600	3,140	3,525	3,815	2,940
June	1,308	2,702	1,440	4,280	4,555
July	2,205	3,000	2,191	4,655	7,595
August	1,675	2,347	1,660	2,720	3,735
September	1,150	2,200	2,700	2,320	4,395
October	1,835	1,935	2,670	3,005	4,295
November	1,895	2,567	2,850	3,281	3,175
December	553	1,420	1,085	1,920	860
January	2 090	905	1,760	2,405	4,660
February	1,320	1,260	2,290	2,640	3,360
March	3,565	7,460	7,950	10,030	8,015
	20,946	32,815	32,996	50,112	47,880

During the year I have resumed some experimental work which I started some eight years ago, in the separation of the active principle in mallein. This work is incomplete and a report thereon must necessarily be deferred until more data is available.

TUBERCULIN.

The disbursements of this product have shown an increase during the year. Special tuberculin has been disbursed in certain specific instances for the purpose of determining the value of methods of application other than the subcutaneous injec-

tion. A new product has been prepared which I have named '*tuve-dis*' from the fact that it is a special tuberculin distillate and the experimental results with this product are so far satisfactory. Whether it will prove of any practical value can only be determined by further experimentation along lines which we are unable at present to consider.

The disbursements of tuberculin for the routine testing of cattle for the past five years have been as follows:

—	1907-08.	1908-09.	1909-10.	1910-11.	1911-12.
April	569	878	648	654	673
May	848	829	418	1,178	810
June	206	992	496	568	505
July	257	1,190	887	432	645
August	336	323	760	544	185
September	583	214	335	632	477
October	276	458	474	381	632
November	565	826	561	801	1,340
December	735	807	488	621	420
January	562	322	282	1,087	899
February	575	257	634	561	420
March	482	1,035	617	797	957
	5,934	8,061	6,600	8,256	7,963

BLACK-LEG VACCINE.

Black-leg Vaccine has continued to be prepared and disbursed during the year and the lack of complaints is evidence that it has given satisfaction. The vaccine package is giving satisfaction and is eminently suited for the putting up of this product. Our disbursements for the past five years have been as follows:—

—	1907-08.	1908-09.	1909-10.	1910-11.	1911-12.
April	250	2,815	1,330	843	2,076
May	392	1,177	1,114	2,013	826
June	554	601	1,714	2,866	463
July	392	572	1,007	678	416
August	254	550	310	427	1,023
September	586	734	899	569	1,328
October	998	260	300	4,694	1,019
November	785	218	788	1,801	568
December	1,560	410	380	345	463
January	...	35	136	147	55
February	270	4 0	4,761	380	188
March	990	902	730	3,101	1,085
	7,031	8,064	13,469	17,264	9,510

ANTHRAX VACCINE.

Anthrax Vaccine is still prepared and disbursed on silk threads which are held in a special clip attached to the cork of the container. This method of putting up the vaccine is the most suitable means for its presentation to those desiring to immunize animals and we found that put up in this manner it is efficient for six years in affording adequate protection against an experimentally inoculated virus. The disbursements of this vaccine have been larger than for any year since we have been engaged in its manufacture. It is particularly gratifying to know that this vaccine was used

under the supervision of Dr. Evans in connection with an outbreak occurring in Alberta without any apparent reaction in the inoculated animals and that no further cases have occurred in the immunized animals, which include horses, sheep and cattle. The sheep during the period of observation while they were undergoing the process of vaccination gained considerably in weight.

Our disbursements for the past five years have been as follows:—

——	1907-08.	1908-09.	1909-10.	1910-11.	1911-12.
April	339	.....	.....	21	56
May	17	.....	38	70	60
June	.....	.....	112	.....	200
July	98	265	47	36	412
August	77	75	40	.....	40
September	5	10	62	.....	240
October	15	43	17	32	12
November	.....	.....	.....	.....	.....
December	32	25	.....	.....	.....
January	.....	10	.....	.....	6
February	.....	.....	.....	.....	330
March	.....	36	70	95	.....
	483	464	386	254	1,356

GLANDERS.

During the latter part of the year we have spent considerable time in familiarizing ourselves with the details of determining glanders by the method of complement fixation. At the outset this work was in the hands of Dr. Evans, but on his leaving for Lethbridge Dr. Reid assumed its details. This has proven a very interesting field of investigation, although it does not appear, at the present at least, that this will supersede the use of mallein in the field. There is a possibility of an error occurring with this method, as there is with any highly technical procedure, and this feature will require careful consideration before any statement can be made as to its suitability for general work. The details cannot, in our opinion, be conducted in any but a properly equipped laboratory and the individual supervising the actual conduct of the work, aside from being highly trained in this special procedure, must of necessity possess a natural aptitude for the work.

The further experimentation with the diagnosing of glanders by this method, coupled with the opportunity of performing careful autopsies, including bacteriological examinations on experimental cases, will place us in possession of much valuable data regarding its value and the same cases may also be used to determine the relative accuracy of this means of diagnosis as compared with the subcutaneous injection of mallein. If such work was undertaken other means of diagnosis such as the agglutination and precipitation methods would increase the ultimate value of the investigations and place us in the position of knowing, at least from the technical standpoint, the degree of error connected with the various measures proposed for the diagnosis of glanders.

HOG CHOLERA.

During the year we have conducted no investigation with this affection, but the continued prevalence of the disease suggests that a series of carefully conducted experiments may possibly enable us to determine the source of infection in obscure outbreaks. Such an investigation cannot fail to be of practical advantage, for a full knowledge of the dangerous sources through which the disease may be introduced will enable the application of more intelligent restrictive measures.

The methods of diagnosis which we are now forced to make use of are not wholly satisfactory from the laboratory or practical standpoint. I anticipate that a study of some of the problems connected with this disease will enable us to perfect our technique and may also indicate a more satisfactory means of dealing with outbreaks.

It will be my endeavour to take up this work during the coming year, as the greater portion of the equipment required is now available for this purpose.

I am aware that some of the commercial houses engaged in the manufacture of biological products are endeavouring to produce a vaccine for effective prevention of this disease. Whether their efforts will result successfully is a question for the future to decide. The nature of the infectious agent is such that more difficulty must of necessity be experienced than has been the case with disorders caused by easily demonstrated organisms.

A feature connected with hog cholera seems, for the moment at least, to have been lost sight of, namely, the possibility of breeding a race which will prove more resistant to the ravages of the disease. The fact that there is a natural immunity exhibited by individuals in a herd suggests the possibility of success attending such efforts.

GELATINE, AND ITS EXAMINATION FOR ENTRY INTO APPROVED FOOD PRODUCTS PREPARED UNDER THE MEAT AND CANNED FOODS ACT.

During the year, we have examined a large number of gelatines designed for use in connection with jellied food products, prepared at various packing houses operating under the Meat and Canned Foods Act. It has been necessary to condemn a portion of the samples as unfit for entry into a food designed for human consumption owing to the presence of toxic products. The appearance of these gelatines has varied to such an extent that one cannot pre-determine the result before conducting an adequate physiological examination.

There is, further, no standard for the examination of such a food material. We have, however, laid down certain principles which we have followed in each case before finally deciding their suitability for entering human food. It is our opinion that an inquiry should be made into this question, dealing with the various steps in the manufacture and treatment of the crude materials, that we may fully understand the formation of the toxic substances (toxines, toxalbumens, ptomianes, &c.), and their possible danger to human health. Of the samples examined, the greater number have been of foreign manufacture and the various grades seem to be used by different manufacturers for entry into their special food preparations. Certain lines of the packing business seem to have a common source of supply. In one instance we approved of a sample which later proved too expensive for the manufacturer to use and in its stead a very inferior product was substituted. As this substitute failed to indicate evidence of the presence of toxic substances during our examination, no alternative was open for us other than to approve of its use. From this statement it is desirable that I record our method of examination, which is the standard that we have adopted for the determination of toxic materials (toxines, toxalbumens, ptomaines, &c.), in gelatines, or food products which they enter as a component part.

In adopting a standard, we have endeavoured to follow the general principles laid down by other observers for the detection of toxic substances, the result of bacterial growth. For this no very definite data is available as practically all of the work reported has been conducted for a different purpose than that of judging the suitability for human consumption of such a complex substance as commercial gelatine.

From the viewpoint of the inspection of uncooked meat products, we have three forms of poisoning in the human being recorded by Edelmann. These are: (1) as a result of the Bacillus enteritidis (Gärtner); (2) as a result of the Bacterium coil, proteus species, &c., and (3) as a result of the Botlismus bacillus.

In each instance the micro-organisms or the toxic substances, which may be formed during their growth, are the active inciting agents of severe illness and sometimes death, when taken with food by human beings. These bacteria can easily be detected when food material is in a fresh state, and, having the bacteria in pure culture, little difficulty is experienced in determining the cause of the trouble. With a sterilized product, such as gelatine, greater difficulty is encountered in determining the cause of a series of poisonings, as we are here unable to select the specific bacteria responsible for the formation of the toxic substances. To detect these substances chemically, is stated by eminent chemists to be practically impossible, owing to the ease with which they are broken up during the necessary chemical manipulation required for their extraction. To detect them by animal experimentation is, then, the only course left to us, and naturally the method by which this may be accomplished concerns us when we have to deal with the suitability of gelatine for human food.

We are conversant with Basenau's method of dealing with fresh meats, which method is primarily concerned with the bacteriological technique required for the identification of the bacteria involved in the process. We are also aware of his methods for the detection of poisonous substances in fresh meat which consists in the feeding of mice, and on the results of this feeding, basing a judgment as to its suitability for human consumption. Another test is also mentioned in the leading works on meat inspection to determine the presence of drugs and products of decomposition, called the '*boiling test,*' the judgment depending on the odour. When odours due to drugs, sexual abnormalities, offensive encapsulated abcesses, icterus (jaundice), parasiticisms, &c., are detected, the meat is considered unfit for human consumption.

In dealing with the gelatines we have a somewhat similar proposition, but also are concerned with a finished product manufactured in an establishment at present not coming within the purview of the Meat and Canned Foods Act. We are also aware that substances may enter gelatine which would under no other condition be allowed entry into a product designed for human consumption prepared in an establishment under inspection. Being aware of this, it has been necessary for us to establish for our own guidance, some means which may be conducted as a standard procedure in our routine examinations. In this we have passed over the feeding tests as being unsuited to our requirements in the detection of minute quantities of toxic bacterial substances.

As Basenau has pointed out, the fatal effects of feeding mice must be taken as evidence of warranting the condemnation of fresh meat, this referring particularly to contamination with the bacillus enteritidis and allied forms of bacteria.

With other small animals we have considered the use of guinea-pigs and rabbits by feeding. As both of these animals are herbivorous we do not consider their digestive apparatus suited for this purpose. Dogs being carnivorous and exhibiting a marked partiality to putrid substances cannot be considered suitable. Hogs, while being like man, omnivorous, are too expensive for the purpose. We are also aware of instances where hogs have maintained bacteria in their intestines without ill effect, yet, the introduction of these bacteria, or, the sterile substances formed by the bacteria during their growth, into the alimentary tract of human beings resulted in serious illness. From this we consider them unsuitable for feeding experiments.

We also consider the '*boiling test*' of little practical value in the judging of gelatine, as this method is dependant upon the element of individual judgment which is a very variable factor. While we do not use these two methods for final judgment the latter is an important guide in our examinations.

With these preliminary remarks we now come to the detailed description of our standard. In this we have followed what has seemed to us the most rational means of examination, namely, that which is used in testing toxines known to be the result of bacterial growth. This consists in the addition of ten per cent of the gelatine to

a sterile normal salt solution after the gelatine has been soaked until soft, and subsequently washed in a similar sterile solution. The soaking and washing is to remove any bacteria or toxic material which may have been adherent to the gelatine during its transportation or manipulation prior to receipt at the laboratory. The gelatine is weighed in its dry state before undergoing the above mentioned treatment, and it is on this weight that our estimation of the dosage is based. The ten per cent solution is then used for subcutaneous injection into guinea-pigs, (preferably those of 250 grammes in weight, these having been shown by various observers to be the most suitable in the routine testing of toxines), in gradually increasing doses from one cubic centimetre to ten cubic centimetres. The preparation of the guinea-pigs is that recommended by Rosenau and consists in the shaving and sterilization of the site of inoculation. It is thus seen that a very small amount of the gelatine under observation is used in an individual test, namely, from 0.1 to 1.0 gramme, which is equivalent to one and a half to fifteen grains of the original dried gelatine.

Ten guinea-pigs are used in each case, and, after the inoculation they are kept, in so far as it is practicable, in a manner as nearly identical as it is possible to secure, to that with which they have previously been accustomed. Each animal is tagged and an individual record is kept of the amount it has received and its subsequent condition. In the event of no symptoms and no deaths occurring in the five day period, the gelatine is passed as being suitable for entry into a human food product, provided, however, it is in other respects satisfactory. Where deaths occur an examination is made to determine whether these are the result of bacterial origin or due to toxic substances contained in the material under consideration.

In this manner we have tested, during the past two years and a half a total of fifty-seven samples, including gelatine and other food products. Thirteen of these have been condemned as being unfit for human food. Where we have had no illness or deaths as a result of the original gelatine we have had no illness or deaths as a result of the finished product.

We are aware that proteid substances may give a re-action when introduced under the skin of guinea-pigs but we have been unable to detect evidences which would lead us to conclude that the deaths in any of our cases were due to such proteid bodies. The fact that the animals do not die is not conclusive proof of the absence of toxic products, for in one of the cases coming under our observation, no deaths occurred, yet the experimental animals were ill. In this instance we had the history of sixteen persons in six families all of whom exhibited similar symptoms of distress, viz.: acute abdominal pain, violent vomition and diarrhœa, followed by prostration. Our experiments in this instance were not only conducted with the product as eaten, but also with samples taken from the bulk in the possession of the retailer and a sample of gelatine secured from the Inspector in charge of the plant and under whose supervision the product was prepared. Our results indicated that the gelatine was directly responsible, in that we secured similar data from the gelatine as we had previously secured from both samples of the finished product.

WATER EXAMINATIONS.

Since October, 1910, we have been conducting periodical examination of the water supplied to the various government buildings and also the water after passing through special sterilizing machines. During the year just ended we have made three hundred and sixty-six bacteriological examinations of water from government buildings.

At the outset, the examinations were required by the Public Works Department from the supplies in the Central Parliament buildings after the installation of the sterilizing machines. Our supervision of the water after treatment resulted in an improvement in this supply, and has resulted in adopting certain routine procedures on the part of the men intrusted with the supervision of these machines which ensure

the safety of this supply. On October 13, at the invitation of Mr. Shearer, Superintendent of Public Buildings for the Public Works Department, I was present in his office at a demonstration of an apparatus for sterilizing water by an ozonizing process. The apparatus did not work satisfactorily, and the water presented a higher bacterial count after passing through the machine than it did before entering it. Other difficulties occurred and as a result none of these machines have been installed in public buildings.

On October 25, sterilizing machines were in operation in the East Block, West Block, Langevin Block and the Harris & Campbell building. On January 2, that at the Canadian building was in operation, while on the 25th the equipment in the Woods building was completed.

The raw water has shown evidence of sewage contamination excepting at intervals. The degree of contamination has varied at different points, a feature which at times has been somewhat puzzling to account for.

The drinking water supply which is furnished by the sterilizing machines has never shown evidence of sewage contamination. A non-pathogenic spore-bearing organism has been found repeatedly, but this is harmless to small experimental animals and we, therefore, conclude that it is also harmless for human beings. On the whole I consider that the results secured by the installation of the sterilizing machines has been very satisfactory, and is an adequate safeguard in the prevention of water-borne disease.

I do not conisder that the addition of details concerning our examinations of water would add materially to this report as the results are available for reference. by properly authorized individuals.

RABIES.

We are still called upon to determine the presence or absence of rabies in animals, material from which is forwarded to the laboratory for examination.

Formerly, we have not depended on the finding of the bodies described by Negri in the large pyramidal cells of Ammon's horn. We have, however, during the past three years, devoted a considerable amount of time to the detection of these bodies, and have subsequently had our findings checked by our animal inoculations which have been connected as a usual procedure. Our results have been, that when we found indisputable evidence of these bodies in the cells referred to, the inoculated animal, after a suitable period of observation, developed rabies and died. After the development of the disease the clinical picture has been characteristic. I refer in this to our work with rabbits as the experimental animals. Smaller animals, such as guinea-pigs, have not proven satisfactory for this work, and we do not attach much importance to any results which we may obtain with these animals.

Cases arise, however, where no Negri bodies are found, yet all of the experimental animals succumb to the disease. Why this is so we can offer no opinion. We do know that we are unable to demonstrate Negri bodies in undoubted cases of the disease which appear to be due to a virus with an enhanced virulence. This has been the experience of the majority of workers making a study of the microscopic diagnosis of this affection. It has also been our experience that by passing the virus through a series of animals, while the original material may have shown the bodies in relatively large forms and very distinct, as we progress in the serial inoculations the bodies become smaller and less distinct, there appearing to be some direct relationship between their size and virulence, the smaller bodies indicating an increased strength to the virus.

While we are of the opinion that the presence of the bodies indicates the existence of rabies in at least 98 per cent of the cases, it does not necessarily follow that their absence is proof of the absence of rabies. While this is the result with regard to the

Negri bodies, I may state that all of our inoculations with material from proved cases of rabies have not been of unqualified success in producing death with characteristic symptoms. We have observed instances where two out of three rabbits have died with unmistakable symptoms in from fifteen to thirty-five days, yet, another inoculated with the same material at the same time and under as nearly identical conditions as it is possible to secure, remained alive and well after a period of observation extending over six months. This is our reason for using three rabbits where animal inoculations alone have been depended upon

From our experience, as above outlined, it is apparent that neither method is free from a possible source of error. The error cannot be wholly eliminated, although care does reduce it to the minimum.

We are now dealing with the diagnosis of rabies on the following lines:—On the receipt of suspected material, a microscopic examination is immediately made in every case. Where we secure positive findings of Negri bodies from such an examination, one rabbit is inoculated for the purpose of checking this finding. Where our finding is negative and the history does not clearly indicate rabies, we issue a negative report and preserve material for animal inoculations should such be desired. Where the history is indicative of rabies and our finding is negative, we report the negative finding and inoculate three rabbits forthwith.

Much anxiety can be avoided if those who come in contact with a suspected case of rabies act intelligently. *Where rabies is suspected the animal should not be killed if this can possibly be avoided, but should be secured alive and held where it can do no harm*...If the animal has rabies, unmistakable symptoms will develop within forty-eight hours and the animal will usually be dead within five days. Many instances have come to our notice where a dog has been caught and securely confined to be subsequently shot or clubbed to death before a diagnosis could be established. Had such an animal been kept alive, needless worry would have been avoided and in the events of rabies having developed in the animal, the prompt administration of the Pasteur treatment would have been less painful. In some cases the necessity for treatment would have been avoided by such a procedure.

TUBERCULOSIS.

Our work with tuberculosis during the past year has not been extensive, although some of our results are of considerable scientific and practical interest. Probably the work which we have done in an effort to determine the value of a treatment for pulmonary tuberculosis of the human, reported by Dr. Thomas Dewar (*) of Dunblane, Scotland, will prove of great interest to the readers of this report. These experiments can only be considered as being of a preliminary character, and I hope that opportunity will be afforded us to secure further data at some not far distant date. His method of treating human beings is to give properly graduated intravenous injections of iodoform dissolved in ether, to which has been added an equal amount of liquid paraffine. As to the results following such an injection and the manner in which a beneficial action is produced, I can do not better than present Dr. Dewar's own statement as presented to the Glasgow Medico-chirugical Society on the 3rd of February, 1911, which are as follows:

"How, then, does the iodoform act? The dose is so small and the poison it has to counteract so virulent that it is permissible to indulge in a little speculation.

(*) Thos. W. Dewar, M.D., F.R.C.P., F.R.S.E., Dunblane, N.B. 'Prelinary Report on the Treatment of Advanced Pulmonary Tuberculosis by Intravenous Injections of Iodoform.' Brit. Med. Jour., Nov. 21, 1903.

Same Author. 'Further Report on the Treatment of Phthisis by Iodoform Infusion.' Brit. Med. Jour., Jan. 14, 1905.

Same Author. 'The Treatment of Phthisis by means of Intravenous Injection of an Ethereal Solution of Iodoform.' Glasgow Medical Journal, July, 1911.

Also, John Bain, M.B., C.M. Glasg., 'The Treatment of Phthisis by the Intravenous Injection of Iodoform.' (Dr. Dewar's method) Glasgow Medical Journal, May, 1909.

1. It may act in a germicidal character as its own molecule. It has long enjoyed the confidence of our profession as the best antiseptic in tuberculous disease.

2. If this directly destructive effect is not likely, may it not excite the micro- and macrophages of Metchinikoff, aiding their phagocytosis at the point where the defence is crumbling. If CHI_3 is weak germicidally, it is also comparatively harmless to living cells. It may even be beneficial to and absorbable by them, thereby conferring an increased vitality and fighting power.

3. There is a possibility that the CHI_3 undergoes decomposition, resulting in the production of bodies in themselves more powerfully destructive to germs. While CHI_3 in powder is very stable and unaffected by light, when in ethereal solution it is easily oxidized by the oxygen of the air when the solution is exposed to sunlight.

The first change on oxidation is probably the formation of a transition body, CHIO, brought about by the CHI_3 molecule, having two of its atoms of iodine substituted by one of oxygen. If this transition body now parts with its atom of iodine and takes up the hydrogen we have nascent formic aldehyde (CH_2O) made *in situ*.

Here then we would have a germicide of enormous power with all the increased energy of nascent formation. But there is still a valuable asset in the circulation, a powerful germicide and chemically remarkable, viz., the liberated nascent free iodine. The peculiarity of iodine in the chemistry of organic iodo-substitution bodies is well known. They are unique as compared with the chlorine and bromine substitution bodies, because when treated with HI, free iodine is liberated and H takes the place of I, thus regenerating the normal H body. We have now the free I, capable of producing new organic iodo-substitution compounds with other bodies from which it can be liberated again by a similar cycle of operations, so that the I is alternately combined and free. In this way we have got a chemical mechanism in which the I is used over and over again. For the discovery of this remarkable behaviour of iodine we are indebted to the late Professor Kekulie. It is almost analagous to an enzyme, and helps to explain or account for the power iodoform seems to have in this disease.

Now, while these observations of Professor Kekulie are chemical facts, it may not be in this way that it acts at all. It is quite possible that the whole action resembles serum theraphy. In other words the iodoform may act as a toxin, inducing the formation in the blood and tissues of an antitoxin to the CHI_3, and it may possibly be this anti-iodoform toxin which is inimical to the growth of the tubercle bacilli, and destructive to its toxins; or to put it in another way, by the use of CHI_3 we may produce true opsonisation. However the results are to be explained, it seems to assist patients in their recovery.

In the meantime, until something more powerful and easier of application is introduced, we know exactly what we are using, and that it is generally antidotal in its properties. For in this disease we must not forget that, in addition to the complex and still undefined toxins of the tubercle bacillus, we have in mixed infections to neutralize the toxins of a variety of other germs, differing in each particular case, as well as the poisons derived from cell disintegration due to necrosis (Cook's case). It is a treatment which can be applied without risk to all types and all stages of the disease. If the patient is hopeless, it will diminish his malaise during the day, relieve his cough at night, and so secure him sleep. Now the doses which I use vary from $\frac{1}{4}$ to 1 grain, and are generally administered three times a week. But the intelligent physician must use his judgment and not overdose."

In some of Dr. Dewars' cases reports are given which indicate that under ordinary conditions they would have been unable to perform their ordinary work, but under his care they were not compelled to give up entirely; they have gained in weight and subsequently made an almost complete recovery.

After careful perusal of his data we were somewhat skeptical of the results and undertook on a very limited scale the treatment of rabbits which had been given intra-

tracheal injections of a virulent bovine organism. Our results may be considered as partially successful as the clinical symptoms gradually became less noticeable and the rabbits increased in weight. In one case on which an autopsy was performed to determine the progress of the treatment and the nature of the lesions, we found on microscopical examination that the alveolar walls of the lungs showed a thickening, there were foci in which consolidation had taken place, yet we were unable to demonstrate giant cells or bacilli. Shortly after the inception of the treatment we were satisfied that under ordinary conditions this animal would have succumbed, as it had continually lost in weight subsequent to the intra-tracheal injection of bacilli and continued to lose in weight for the first eight days after the inception of the intravenous iodoform treatment. A slight improvement and concurrent gain in weight from twenty-five to forty grammes per day was observed after this period until the time of his destruction for purposes of autopsy.

The treatment consisted in the intravenous injection (in the ear vein) of two drops (the equivalent of one-sixtieth of a grain of iodoform) of the following solution:—

Iodoform, 1 grain.
Ether
Liquid paraffine *aa* 60 minims.

The solution was freshly made immediately prior to each injection and should be held in an amber coloured syringe on account of the combined action of the light in the presence of the oxygen of the air causing a change in the composition of the iodoform.

Another series of rabbits was similarly injected with tuberculosis by the intra-tracheal method and the treatment with iodoform instituted with three on the twelfth day thereafter. Our results in this instance, however, were not wholly satisfactory, as the first check animal died on the sixteenth day of a generalized tuberculosis, indicating an organism of much higher virulence than we anticipated at the outset. We later confirmed by other experiments conducted in our routine examinations of strains of recently isolated tubercle bacilli that this organism was one of a very virulent type. In this series, however, the treated animals presented a slight gain in weight after the fifth day of treatment and maintained this gain until death took place from a generalized infection. The treatment was too long delayed, thus allowing the disease to secure a greater foothold than was desired for our experiments.

Further experiments with this method of treatment are anticipated and our method will include the inception of the treatment at the time of inoculation in a number of the experimental animals, while in others of the series the treatment will be commenced at stated intervals to determine the relative value of this means in dealing with experimental tuberculosis. It would also be very interesting and might possibly be of value to conduct a similar experiment, using cattle as the experimental animals. Valuable data would be forthcoming from such an experiment that would be of practical benefit.

A very interesting case came to our notice through the Meat Inspection Division in the viscera of a calf forwarded for diagnosis by Inspector Fisher. This calf was but three weeks old and showed the lesions of a generalized tuberculosis involving the liver, spleen, lungs and lymphatic system. A feature of the microscopic examination of the lesions was the large size of the giant cells and their relative frequency in the affected tissues. This case must have been congenital as the lesions were too far advanced to have been formed after its birth.

Another case of tuberculosis of more than ordinary interest was forwarded by Inspector Kellam comprising portions of the viscera of a fat steer. The lesions in this instance were not typical in their naked eye appearance nor was it a particularly easy matter to verify the diagnosis microscopically. We, however, were able to find typical evidence and after a very careful search of numerous smear preparations from affected tissues, found a number of bacilli.

TUBERCULOSIS IN POULTRY.

We have still continued to examine fowls and in this have found a great many affected with tuberculosis. This disease in poultry is very prevalent, if the number of cases which we have received can be considered to bear a direct relationship to its existence. Recently, (November 1911), the Ontario Agricultural College published a Bulletin, No. 193, by S. F. Edwards, M.S., their information relative to its occurrence in Ontario. This bulletin records forty-three outbreaks. Since we commenced to encounter this affection in fowls we have received material from fifty-three outbreaks in Ontario. We have, however, records of the presence of this disease among fowl in various portions of the country indicating that this affection alone is responsible for serious losses to raisers of poultry. In one instance an individual fowl which at our autopsy was found to be tuberculous, was reported to have been valued at over five hundred dollars. It is therefore apparent that the monetary loss in this instance was considerable.

Owing to the many inquiries relative to tuberculosis in poultry it was deemed advisable to prepare a short article or circular (Circular No. 2), on the subject, which is as follows:—

Circular No. 2.

DOMINION OF CANADA.

DEPARTMENT OF AGRICULTURE—HEALTH OF ANIMALS BRANCH.

BIOLOGICAL LABORATORY.

TUBERCULOSIS IN POULTRY.

BY

C. H. Higgins, B.S., D.V.S., *Pathologist.*

Tuberculosis or consumption is a disease that affects fowl as well as the human being, cattle, hogs and other animals. It is caused by a bacillus or germ which is only distinguishable from the germ seen in other animals by elaborate laboratory methods. This affection among fowl was first identified in Western Ontario by Prof. F. C. Harrison in 1901, Prof. F. C. Elford in 1903, and by the writer, in fowls received at the laboratory on May 30, 1904, from British Columbia for an examination to determine the cause of death. Since 1904 the disease has been found by us to be the cause of losses to poultry owners in various parts of British Columbia and also in Quebec, Ontario, Saskatchewan and Alberta. It may be and probably is the cause of losses in other provinces. The disease has also been frequently reported from the Bacteriological Laboratory of the Guelph Agricultural College.

LOSSES.

The losses from this disease have been large to poultry owners, but there is at present no means of arriving, even approximately, at an estimate with any degree of accuracy. Once the disease makes its appearance in a flock the aggregate losses are large although a great number of birds do not usually die at one time.

The following which is an extract from an inquiry made by a large poultry plant when sending an affected bird for examination, is quite the usual experience where tuberculosis makes its appearance in a flock.

> 'We have lost as many as a hundred fowls with this disease during the past two years. They go light and gradually grow weaker, having a yellow or greenish diarrhoea, some eat to the last, others do not. We have fed mixed grains also

mash, but they have been eating a large quantity of wheat screenings. We find many of our chicks go the same as the older hens, dying at all ages. We are beginning to think that artificial hatching has something to do with it and we are afraid it is tuberculosis caused by the overheated air of the incubator during the hatching season. We try to keep the conditions favourable around the houses and yards.'

In commenting on the above it is only necessary to state that tuberculosis, being due to a definite infecting germ, the overheating of the incubator or other conditions surrounding the chicks or fowl will not induce the disease unless the infecting germ is present. The surrounding conditions may render the fowl more susceptible, but cannot produce the disease.

NATURE OF THE DISEASE.

Tuberculosis or consumption in fowls as in other animals is a contagious disease caused by a bacillus or germ. This germ gains entrance to the system, usually with the food, and finding a favourable location grows and extends to the various tissues. This growth of the germ induces symptoms of unthriftiness and this unthriftiness is followed sooner or later by death. The detection of tuberculosis from the symptoms is not always easy. Some may be observed to be "going light," yet they are seen to be good feeders. If picked up it is found that the flesh has almost entirely disappeared from the breast bone and this should make one suspicious that something is wrong. A yellow or greenish diarrhœa is frequently present in affected birds, and where this is present the type of the disease is most dangerous to the remainder of the flock, as the germs are to be found in the droppings in immense numbers. One of the most frequent symptoms seen early in the course of the disease is lameness, a result of the infection involving a joint of the leg. Lameness is mentioned by persons forwarding fowls for diagnosis more frequently than any other symptom where our subsequent examinations have proven the trouble to be due to tuberculosis. So frequently is lameness the principal symptom observed that I am at once suspicious of tuberculosis whenever it is mentioned.

COURSE OF THE DISEASE.

Fowl affected with tuberculosis may die in a few days from the first appearance of symptoms or they may linger for weeks, gradually becoming more emaciated as the disease progresses, until they die from exhaustion. The progress is largely dependent on the strength of the invading germ and the natural resistance of the bird. Some outbreaks of the disease follow a more rapid course than others, usually, however, the course in an individual extends over weeks and sometimes months may intervene before death takes place.

POST MORTEM FINDINGS.

The post mortem findings in fowl tuberculosis, when considered in relation to the symptoms and general history, are characteristic. The liver is usually the principal organ affected and there are lesions, from the size of a pin point to that of a large pea, which are white or yellow in colour. The larger lesions when cut into give a gritty sensation as the knife passes through them. These lesions are distinct from the liver tissues and may be quite easily separated from the liver itself. In the more acute cases the liver may be greatly enlarged even to twice its normal size. This enlargement in chronic cases is noticeable. The spleen is usually involved, the lesions having the same characters as mentioned for those in the liver. The enlargement of the spleen is usual and it may be four times its normal size. The intestines may or may not be involved. When lesions are present we find nodules from the size of a small pea to that of a medium sized nut. The minute dissection of these usually presents a free opening into the inside of the bowel and at this point

of entrance there is an ulceration. It is through this opening from the nodule on the intestine to the interior of the bowel that the bacilli gain access to and are so easily distributed by the droppings.

Other visceral organs are seldom involved. It is frequently observed that the joints, notably that of either or both hips, may be the seat of tubercular ulcerations. Such an ulceration is the cause of lameness during life.

PREVENTION AND TREATMENT.

In the prevention of tuberculosis and other infectious diseases of fowl, sanitary surroundings with plenty of sunlight and fresh air are requisites of prime importance. In our opinion these features are best obtained by use of the modern cotton front house, a number of types having been described by various poultry authorities. Circular No. 7, prepared by Prof. A. G. Gilbert of the Experimental Farm staff, describes in detail the method of construction and may be obtained on application.

The best means of preventing and treating tuberculosis in fowls is to destroy the entire flock if all have been running together, and to thoroughly cleanse and disinfect the quarters which they have occupied with any good disinfectant, one of which is a five per cent solution of crude carbolic acid. This may be made by adding two teacupfuls of crude carbolic acid to a pail of hot lime wash. This should be applied with a spray pump, brush or old broom to all parts of the house occupied by the fowl. This method of disinfection is suggested, owing to the fact that in tuberculosis or consumption in fowls, as has already been indicated, the bacilli or germs are found in the droppings in great numbers and these should be destroyed. This action is further recommended as it has been shown that fowls dead of tuberculosis if eaten by hogs communicate the disease to them and it is probable that the droppings would also communicate the disease in a similar manner.

When destroying the birds after it has been demonstrated that tuberculosis is present, some may be suitable for food if an examination of the livers shows no yellow or white spots from the size of a pin point to that of a pea, and there are no nodules or lumps on the intestines. When these lesions are present the flesh cannot be considered suitable for human food.

We have found that eggs from tuberculosis fowls may contain the bacilli or germs in the white, and have also demonstrated that they are in sufficient numbers to infect small experimental animals. This suggests a possible source through which tuberculosis may be introduced into a flock, namely by the unsuspecting purchase of eggs from some one who has tuberculosis among his fowl.

The drastic measures above recommended should be followed in all cases when tuberculosis appears among fowl. These measures while temporarily entailing a considerable loss will in the end prove the most economical to the owner and the community.

INSTRUCTIONS FOR SENDING MATERIAL FOR EXAMINITION.

Where it is desired to determine the nature of any condition causing losses among fowl, an examination will be undertaken by the biological laboratory, Ottawa providing suitable material is supplied. If possible, two live but affected birds should be forwarded by express in order that a thorough autopsy may be made. It is not necessary to prepay the express. When the condition has been found at autopsy the diseased tissues may be sent by mail, if properly packed and preserved. Tissues may be preserved in pure alcohol or a solution of one part of formaldehyde to nine parts of water. After an examination has been made suggestions will be forwarded for the prevention of further losses.

Specimens sent by express or mail should be addressed to the Biological Laboratory, Ottawa, Canada.

Information concerning the losses which have been experienced should be sent with the material in order that it may be properly identified. The name and address of the sender should be written plainly so that the result of the examination may be forwarded with the least possible delay.

November 6, 1911."

TUBERCLE BACILLI IN THE EGGS OF TUBERCULOUS FOWL.

Some experimental work has been conducted with tuberculosis in poultry, the most important of which has been in connection with the danger of conveying the infection through eggs. Fifteen eggs were received from a flock of fowl in which the disease had been previously diagnosed as tuberculosis, the result of an autopsy performed at the laboratory to determine the cause of unthriftiness. Six of these eggs were used for microscopic examination and in three of them tubercle bacilli were demonstrated without difficulty. Eleven guinea-pigs were inoculated with material from ten of the eggs (one only of the series used for microscopic examination is included in the inoculation experiments), with the result that in two of these animals unmistakable evidence of tuberculosis was found, after allowing a suitable incubation period to elapse. This supplies us with incontrovertable evidence that under proper conditions the bacilli of avian tuberculosis can be transmitted to guinea-pigs by the subcutaneous inoculation of eggs from infected fowl. The danger to other animals has not been determined and there are also many practical points with reference to the transmission of this disease, one of the most important of which is, the possibility of conveying the disease to the young chicks during their incubation through the medium of the bacilli contained within the egg. We are preparing to secure evidence in this connection. A curious feature in connection with the presence of the bacilli in the egg is, that they are most easily found in close association with the germ.

TRANSMISSION OF TUBERCULOSIS FROM BIRDS TO MAN.

As a recorded instance of the danger of transmission of tuberculosis by birds to the human being, the following extract from a lecture by Dr. H. Roger*, professor of comparative pathology of the Faculty of Medicine, Paris, is very significant.

'Animals that live in close promiscuity with man frequently contract tuberculosis, and may transmit it. By opposition to the belief of times gone by, the dog is often suffering with it. It may localize itself in the kidney, giving rise to lesions of softening and throwing in the urine considerable quantities of bacilli. Again see the danger of the propogation, which is so much greater that canine tuberculosis is easily overlooked. It is often manifested by productions of neoplastic appearance which resemble more those of cancer than of tuberculosis.

These home pet animals are yet more dangerous. Those among you who have been in my laboratory have seen a parrot, now dead, which had cutaneous tuberculosis. As is commonly the case, this bird had been infected by her owner, who had advanced tuberculosis, and the bacilli of human origin had invaded the skin of the head of the bird and promoted the growth of the warty lesions. In cases of this kind the animal, annoyed by these growths, scratches itself as it can; scabs of the skin get loose. These are particularly rich in virulent bacilli. Their dissemination spread the disease, and the infection is so much more dangerous when passing from the parrot; the pathogenous agent seems to have gained more infectious power. What is the end of the history of this bird? The first owner died. By his will the parrot went to a young woman healthy and strong. After a few months she began to cough, to lose flesh. Affected with acute

* Am. Vet. Rev. Vol. 41-P. 2 European Chronicles.

tuberculosis she died in less than a year. No one around her had suspected the cause or origin of her disease. Her physician had never suspected it. Having become too homely, no one wanted the bird any more, and he was sent to my laboratory, where, for those who have seen his lesions, a diagnosis will remain evident and easily confirmed by bacteriologic examination.'

ENTERO-HEPATITIS OR BLACK-HEAD IN TURKEYS.

An increasing number of queries are being received concerning this affection in turkeys, and from these queries and the increasing price of this very valuable food animal it is evident that the ravages of this disease or some other equally potent factor has almost annihilated the turkey industry in certain sections of Canada. We have offered what assistance we could, but, unfortunately, have been able to do very little to prevent the appalling losses. In order that the information which we have gained during an experience of ten years may be available a circular has been prepared (Circular No. 1), to meet the questions propounded in the many inquiries which we have received. This circular also includes what we at present consider to be the best means of treating affected birds, namely, by the administration of properly diluted muriatic acid. In some instances from the reports which have come to our notice, where this treatment has been used, the results have been remarkable.

It has occurred to me that possibly the value of this treatment may be increased by the concurrent use of a properly prepared bacterial vaccine designed to reduce the number of bacteria in the intestine. Certain favourable results have been reported to me by a prominent veterinary surgeon who used the acid in conjunction with one of the commercial bacterial vaccines. I believe that the use of a specific vaccine would be followed by much more favourable results and purpose undertaking some experimental work in this connection during the coming year. I also desire to supplement the data which we have already secured, a summary of which is herewith presented.

Our experimental birds, five in number, were very ill on their receipt (October, 1910) and it was a question whether they would survive from one day to the next. They were immediately given the muriatic acid in the proportions recommended in the circular printed below. In a week there was some improvement noted and in three weeks we considered that they had made a full recovery. To determine whether the lesions which we assumed as being present from the aggravated symptoms which they presented on arrival, one was autopsied with the result that the liver was perfectly normal and the caeca showed but two small erosions which under ordinary circumstances would have passed unnoticed. We did not consider that this bird was affected at the time it was autopsied.

In the spring of 1911, two of the turkey hens were set on their eggs and hatched fifteen poults. These were allowed to range with the older birds with the result that aside from the deaths due to accidents, there were no deaths until August. Of the fifteen poults, ten died from accidental causes and five died of entero-hepatitis. Of those dying of entero-hepatitis, one was carried over the first attack by the muriatic acid treatment, two were carried over two attacks, and the other two carried over the third and fourth attacks. The acid was not continuously before them as it was desired to determine its value in carrying affected birds over the acute attack. We consider that it is fairly successful for such a purpose but not infallible. It may be of advantage to give the acid forcibly once or twice a day in order that the requisite dose may be introduced into the digestive track.

In September a very interesting fact was observed through the accidental death of one of the old turkey hens as a result of eating poisonous material thrown out with the laboratory refuse. At the autopsy on this bird it was found that while the liver presented no lesions of entero-hepatitis, there was a large core in one of the

cacca. As this bird had shown no evidence of illness since it had recovered from the first attack, we have assumed that it was a chronic carrier of the infective agent. From this assumption we believe that a bird once affected may overcome the infection but is yet a menace to the flock on account of its being a chronic carrier and disseminator of the infective agent.

We hope to supplement the data above recorded during the coming season as provision is being made for a more comprehensive study of some of the problems with which we have been confronted during the past year.

The circular on entero-hepatitis above referred to is as follows:—

Circular No. 1.

DOMINION OF CANADA.

DEPARTMENT OF AGRICULTURE—HEALTH OF ANIMALS BRANCH.

BIOLOGICAL LABORATORY.

BLACK-HEAD IN TURKEYS.

(Entero-Hepatitis.)

BY

C. H. Higgins, *B.S., D.V.S., Pathologist.*

Entero-hepatitis or black-head in turkeys is a disease of fowl, infectious in its nature, usually seen in its most aggravated and fatal form among turkeys. Other fowl may be subject to the disease but losses among them are small compared with the loss among turkeys. The first investigations as to the nature and cause of the malady were made by Dr. Theobald Smith in Rhode Island, under the joint auspices of the United States Department of Agriculture and the Rhode Island Agricultural Experiment Station during 1894 and 1895. Various investigators have since taken up the study of the disease as it has become more widely distributed and a distinct menace to the turkey raising industry. Detailed information relative to the manner in which the disease is transmitted from an affected to a healthy bird is lacking. It is believed that this infection is direct from the droppings or from the ground on which they have been deposited. There is still some difference of opinion as to the exact organism responsible for the lesions produced but it is generally conceded to be a minute protozoan parasite. We anticipate conducting experiments and hope to be able to arrive at some definite conclusions regarding these and other unsettled points.

LOSSES.

The losses from this disease have been enormous and I believe that it is a factor responsible for the high price of turkeys. The extent of these losses is well indicated from the fact that two decades ago a single small island (Block island) off the Rhode Island coast provided two tons of marketable birds each year, while to-day but five hundred pounds are available from the same locality. Statements are also current that in localities in Ontario where ten carloads of birds were available eight years ago it is now difficult to secure two carloads. The reason to be ascribed for this falling off in production is the difficulty of rearing stock that can withstand this affection.

In Canada the disease was first mentioned by Gilbert in the Experimental Farms Report for 1900. It has since been repeatedly reported upon evidence obtained at this laboratory and at the Bacteriological Laboratory of the Guelph Agricultural

College. From the information which we have obtained through communications received at this laboratory, it is evident that there is not a province in Canada where entero-hepatitis does not make its presence felt with more or less severity each season. In some portions of the country the disease has made such inroads on the turkey industry as to almost prohibit the raising of this class of fowl.

The usual history concerning losses is that an individual having a few fowl desires to supplement his poultry operations by raising a few turkeys. He is an unsuspecting buyer of parent stock or sittings of eggs until experience has made him painfully aware of the fact that he has bought with the birds or eggs the infective agent of this disease which later separates him from his original investment and the time he has spent in caring for the young poults. The season is then too late for him to attempt another start, his premises are infected, and, discouraged at the result, he decides to relinquish further effort in this direction. It is quite common where entero-hepatitis makes its appearance to lose seventy per cent of the young stock before they are sufficiently mature for table purposes.

NATURE OF THE DISEASE.

The early symptoms presented by affected birds are not particularly characteristic. Affected birds, however, will separate from the remainder of the flock. This separation or lagging behind does not appear to be a desire for seclusion but the result of being unequal to the task of keeping up with the others from physical exhaustion. The droppings are more fluid than normal and may be streaked with yellow. Gas bubbles may be sufficiently numerous to give a frothy appearance. The head may be and usually is darker in colour than normal. This dark colouration may disappear and reappear at irregular intervals while the bird is at rest, but excitement usually causes a bright red colouration.

The best means of early diagnosis is the examination of the droppings for evidence of diarrhœa or a yellow colouration of the fæces. Feeding time may prove the most appropriate for such observation. Where this is not convenient owners should provide some means of determining an infection at the earliest possible moment.

COURSE OF THE DISEASE.

Affected birds if untreated may die in a few days or may linger for a week or longer after the first appearance of symptoms according to the virulence of the infecting agent. In some cases the onset is so rapid and free from outward manifestations as to be recognizable only by an autopsy. Without treatment or a complete change in diet and surroundings, the course is usually fatal.

POST MORTEM FINDINGS.

The post mortem findings are characteristic. The lesions are confined to the liver and intestinal tract. The liver is the seat of lesions which appear on the surface as circular spots about the size of a five or ten cent piece, yellow or whitish yellow in colour and surrounded by what to the naked eye appears to be normal liver tissue. At the point between the lesions and the liver tissue, a ring almost bright red in colour is observed. These lesions in the liver if cut open may have a uniform colour throughout or in the more chronic cases there may be a core in the centre. The intestines may be the seat of a chronic inflammation. The caeca or two blind guts which lie along the course of the intestine and enter it about six inches from the vent are usually inflamed and in either or both a single or a number of lesions the size of a walnut are usually present. These lesions are yellow in colour, have a thick wall and a degenerated centre. There may be in addition to the above in severe, acute or chronic cases, either a localized or general peritonitis (inflammation of the outside wall of the intestines) with adhesions and fluid in the cavity.

PREVENTION AND TREATMENT.

The placing of poults on clean, sanded board floors in a dry well lighted and well ventilated building with southern exposure, is considered a means of prevention. The continued contact with the floors, however, tends to weaken the poults. I believe it to be an advantage to see that they are quartered on sanded board floors at night and prevented from ranging in the early morning when the grass is wet. When the birds are older the roosting places should receive consideration. The free application of lime and sulphur wash (that used in spraying fruit trees is suitable) on the ground under the roosting places and the ground on which they are reared two or three times during the season, will destroy any infection on the ground. We believe that persons raising turkeys should be very careful not to introduce the disease when making additions to improve their stock. A turkey tom may be a source of infection when he heads the flock of a neighbourhood or the disease may be introduced with sittings of eggs. The greatest care should be exercised to prevent any possible source of infection reaching a flock or locality now free from disease.

The early diagnosis of the first case is an essential feature in connection with the prevention and treatment. As has already been indicated, it is the early diagnosis that will prove the most essential factor in successful prevention and treatment. The isolation of the first case may many times prevent further manifestations of the disease. From our experiments, however, it appears that there may be chronic carriers of the disease whose droppings are continually infected, notwithstanding the fact that they exhibit very slight if any symptoms. This suggests that isolation may not be as potent a factor in preventing losses as desired, but I believe that it should be enforced to such an extent as will prevent the old and young flocks intermingling after the first appearance of the disease.

Our experiments in the treatment of entero-hepatitis have been directed to the finding of some agent that will successfully carry affected birds over an acute attack and enable their being conditioned for market.

There is to my knowledge no known specific for controlling the ravages of this affection. The use of muriatic acid in the drinking water was found some six years ago to be followed by beneficial results on affected turkeys which I was trying to raise at my home. Later it was given a further trial and three years ago a single turkey at this laboratory made an apparent recovery. During the past two years we have recommended it as being the best medicinal agent which we know to assist in overcoming the affection. Last year five affected birds recovered after receiving liberal allowances of this acid. One of these which was later autopsied to determine the presence or absence of lesions, was found to be normal in every respect so far as we could determine.

Some apparently remarkable recoveries have followed the use of this acid, but one cannot hope to bring all affected birds through an attack. I was first prompted to use this acid as I found the contents of the digestive tract in turkeys dead of entero-hepatitis or black head to be alkaline in reaction.

The acid to be used is a teaspoonful of muriatic acid (Acid. Mur. Dil. B. P.) in a quart of drinking water. This acidulated water should be placed in a porcelain or glass vessel and is suggested in the hope that the birds may be carried over an acute attack. At the outset when the birds show evidence of being severely affected, it may be of advantage to triple the amount of acid (using three teaspoonfuls to the quart of water) for the first three days. This amount will not injure the turkeys and may assist them in more rapidly overcoming the infection.

They should be confined during this period on dry, sanded board floors in well lighted and well ventilated quarters and allowed access to no other liquid. If allowed to roam they may obtain sufficient water for their requirements from the dew laden grass or other sources and, therefore, will not drink the acidulated water. If confined, green food should be supplied in addition to the grain ration.

Other medicinal agents may give equally satisfactory results in the treatment of affected birds as that above outlined, in which case my advice would be to stick to the remedy that has proven the most effective. If such other medicinal agents are effective we will appreciate learning of them. We will also appreciate information as to the success or otherwise of th atment herein recommended.

INSTRUCTIONS FOR SENDING MATERIAL FOR EXAMINATION.

Where it is desired to determine the nature of any condition causing losses among turkeys, an examination will be undertaken provided suitable material is supplied. It is preferable to have affected turkeys forwarded alive by express in order that a thorough autopsy may be made. The express charges are paid by the Biological Laboratory. When the condition has been found at autopsy the tissues may be sent by mail if properly packed and preserved. Tissues may be preserved in pure alcohol or a solution of one part of formaldehyde to nine parts of water. After an examination has been made, suggestions will be forwarded for the prevention of further losses. Specimens sent should be addressed to the

Biological Laboratory, Ottawa, Canada.

Information concerning the losses which have been experienced should be sent with the material, in order that it may be properly identified. The name and address should be written plainly in order that the result of the examination may be forwarded to the sender with the least possible delay.

October 28, 1911."

In the foregoing I have outlined some of the more important phases of the work of this laboratory during the past year. In some instances it has been deemed advisable to include data from some of the investigations undertaken prior to the commencement of the current year, in order to present a full statement of our results.

I had hoped that it would be possible to include in this report some detailed drawings in colours illustrating features of our work and also photographs of gross and microscopic specimens which would have added greatly to its value. The necessary time for this work, however, has not been available.

In closing, I desire to thank the members of my staff for their loyal and painstaking efforts, and I anticipate that the year which we are about to enter will prove more fruitful than that just closing.

I have the honour to be, sir,

Your obedient servant,

CHAS. H. HIGGINS,

Pathologist.

The Veterinary Director General,
Ottawa, Ont.

APPENDIX No. 9.

S. HADWEN, D.V.S., FIRST ASST. PATHOLOGIST.

EXPERIMENTAL FARM,
AGASSIZ, B.C., March 31, 1912.

SIR,—I have the honour to forward my report for the year ending March 31, 1912.

The major part of my time has been taken up by the Red Water investigation at the Experimental Farm, Agassiz, B.C., and I am pleased to state that the barn for housing the experimental animals, and the laboratory are now in running order. The site for the laboratory, which was chosen by Mr. J. H. Grisdale, the Director of Experimental Farms, and Mr. P. H. Moore, the Superintendent of the farm, proves to be very suitable. I believe that the location of the laboratory, and the co-operation of these gentlemen, will help out the investigation very much.

My report this year on the Red Water is brief, the experiments are just under way, and none of them far enough advanced for publication.

My spare time, as heretofore, I have devoted to the study of ticks, and protozoology, I am incorporating some notes on the live history work I have been able to do, the most important being the life history of *Ix. angustus,* establishing the fact that the larva and nymph of this species possess an important character which is not present in the adult. this, I believe, is a rare occurrence among ticks.

During the year Dr. Watson and I published an article in Parasitology on Canadian Trypanasomes. In this article we each described three new species of trypanasome, one of which I have named in your honour, *Trypanasome rutherfordi.*

I made several long trips during the year. In August, I was requested to read a paper before the A.V.M.A. in Toronto, in which I described the work we are doing on *Haematuria.* The general consensus of opinion I gathered while there, was that the experiments were practical and likely to yield results. I also spent some time in Manitoba during September, and in December and January took a trip up to the north to look into a suspected disease among the goats there.

In conclusion, I wish to express my regret at your leaving the service, and to thank you for the last time officially, for the great interest you have always shown in experimental work, which I know was an honour, coming as it did, from one who had so many duties to attend to.

My thanks are also due to the farmers at Mount Lehman, B.C., where I was stationed, for their help in the work, and for their appreciation of your policy, which was evinced by their presenting me with a testimonial upon my departure, also to Mr. P. H. Moore, the Superintendent of the Experimental Farm at Agassiz, B.C., for his co-operation.

HAEMATURIA.

There is little to add to my previous articles on Haematuria. I have lately, however, come across a case where I found evidences of bleeding growths in the ureter, and in the pelvis of one kidney, this is the first case I have found in 22 consecutive post mortems. It is not astonishing that this should occur, but it is probably not a common occurrence.

A photograph was lately taken of the bladder from cow No. 58, the sub-mucous hemorrhages show very clearly, and I am including a coloured photograph of the same.

A number of experiments have been started and it is to be hoped that these will be successful, but until they are completed there will be little to report.

SWAMP FEVER.

During the month of September, you instructed me to take a trip through the Riding Mountains in Manitoba, to endeavour to find out what was causing the heavy mortality among the horses there. Dr. McGilvray accompanied me, and we visited a number of farms together. I may say that had it not been for Dr. McGilvray's help, I should have been much at sea in diagnosing a number of different maladies affecting horses, which were all being classed as Swamp fever. We were unfortunate in not being able to come across any cases that were definitely affected with Swamp fever, but we came across a number of verminous anæmias, and we came to the conclusion that many of these so called Swamp fever cases were in reality verminous ones. I secured a number of specimens of the *Sclerostomidæ* of the three genera i.e., *Sclerostomum, Triodontophorus,* and *Cylichnostomum.* In all cases I found the aneuerismal *Sclerostome* (*Sclerostomum vulgare*) which received confirmation by Dr. McGilvray finding two aneurisms.

In several cases, when a post mortem examination was being made, we found the fœcal mass contained in the cœcum fairly moving with *Cylichnostomes,* these worms being very small, are apt to be overlooked, unless one is familiar with them. They are true blood suckers, and the walls of the gut showed plainly the damage which they and the other forms were doing.

THE LIFE HISTORY OF *IXODES ANGUSTUS* (BANKS).

(From proceedings B. C. Entomological Soc., 1911.)

This tick is found on a variety of animals, but in British Columbia occurs principally on squirrels (*Sciurus hudsonius douglasi* and *Sciurus hudsonius vancouverensis*).

The life history, as given below, is a result of a series of experiments made in summer and winter at room temperature. The time given of 221 days for the complete life cycle is probably very nearly what occurs in nature.* It would appear that the time required for *Ixodes angustus* to go through its life cycle is shorter than in many other varieties of Ixodes, as squirrels have nests, and it is in these that ecdysis occurs, the process being naturally hastened by the warmth of the animal.

The squirrels from which the ticks were taken, were shot at all times of the year and had about an equal number of ticks upon them. One point to note about squirrels is that they do not seem to wander far away from their abodes, and are often seen feeding day after day in the same spot; thus, any gorged ticks which dropped off them to moult would stand a good chance of getting on to the same animal again. Another interesting feature is the fact that males were seldom found together with the females on the squirrels, nearly 200 females and nymphs were captured before a single male was encountered. This means that copulation between the sexes occurs almost wholly in the squirrels' nests or on the ground.

The same general life history should apply also to the ticks found on other nesting animals, such as coons, and perhaps skunks, but to those which move about a great deal, like the mink and martens, I do not think it would apply, nor to bears, which den up after the cold weather has started and would no doubt go into their dens free from ticks.

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*The complete life history of *Ix. vicinus* will in the majority of cases take one year and a half or two years.—(Wheeler.)

Ixodes texanus (Banks) was found twice on coons (*Procyon lotor*) captured in hollow trees, both times in the dead of winter; one of them up north when the thermometer was much below zero. The exact temperature was not ascertained, but the trees round about were cracking with the frost.

These observations are further confirmed by the fact that no ticks have been found on the hares (generally known as rabbits) of the lower mainland in the winter, whereas in the summer ticks are almost invariably found on these animals.

Though ticks are able to withstand low temperatures without being killed, they become torpid when cold, and in my experiments, would not attach themselves to animals unless they had been previously warmed. Once they are firmly attached they are protected by the hair, and are, of course, kept warm by the animal's heat.

Ixodes angustus (Banks).

	Average of
Gorged female—	
Oviposition began at	16 days
Larvae hatched at	73 "
Larvae fed on rabbit—	
Average time of feeding	2·5 "
Ecdysis, larvae issue as nymphs	61 "
Nymphs fed on rabbit—	
Average time of feeding	2·5 "
Ecdysis, nymphs issue as adults	29 "
Adults attach and remain for	7 "
Allowance for hardening of skin after ecdysis and time in waiting for host, ten days at each stage	30 "
	221 "

Thus it is possible for Ixodes angustus to go through its various stages in seven months.

PLATE I.

Ixodes angustus ♂ venter surface.

PLATE II.

Ixodes angustus ♀.—Showing shape of capitulum and scutum.

PLATE III.

Ixodes angustus O.—The capitulum differs markedly from ♂ and ♀ at the base of the palpi two pointed processes are seen, and two *auriculæ* are seen laterally from the base.

PLATE IV.

Ixodes angustus L.—Exhibits the difference from ♂ and ♀, much the same as *O*.

NOTE.—For descriptions see Nuttal 1, Warburton, &c., (ticks, Part II.) For life history, see page 93 of this article.

NOTES ON TICKS.

TERMS AND SIGNS.

♂ . . . . . Male.
♀ . . . . . Female.
O . . . . . Nymph.
L . . . . . Larva.

Ixodes angustus (*Banks.*)

1 ♀ gorged off *L. americanus,* Mount Lehman, B.C. . . . . 21-6-'11
Oviposition began. . . . . 3-7-'11
Eggs hatched. . . . . 15-9-'11
L. placed on tame rabbit. . . . . 28-9-'11
L. came off tame rabbit, gorged. . . . . 14 on 2-10-'11
23 on 4-10-'11
O. hatched. . . . . 2 on 2-12-'11
1 on 6-12-'11
1 ♀ gorged off *L. americanus,* Mount Lehman, B.C. . . . . 27-6-'11
Oviposition began. . . . . 9-7-'11
Eggs hatched. . . . . 20-9-'11
L placed on tame rabbit. . . . . 4-10-'11
L's came off tame rabbit, gorged—
14 on. . . . . 5-10-'11
18 on. . . . . 6-10-'11
17 on. . . . . 8 & 9-19-'11
O's hatched—
8 on. . . . . 2-12-'11
3 on. . . . . 2-12-'11
5 on. . . . . 12-12-'11
3 O's gorged on tame rabbit, taken on *S. hudsonius douglasi.* 28-8-'10
Hatched between. . . . . 29-9-'10 and 21-11-'10
Adults which emerged, 1 ♂ and 2 ♀s.
1 O gorged. . . . . 12-8-'10
Hatched between. . . . . 29-9-'10 and 21-11-'10
Adult emerged.
O's gorged off *L. Americanus,* Mount Lehman, B.C.—
1 gorged. . . . . 21-6-'11
1 gorged. . . . . 23-6-'11
Hatched. . . . . 23-7-'11. 1♂ and 1 ♀
1 gorged. . . . . 28-6-'11. Hatched. . . . . 24-7-'11. 1♂
1 gorged. . . . . 28-6-'11. Hatched. . . . . 25-7-'11. 1♂
♀ gorged off *L. Americanus*. . . . . 24-6-'11
Oviposition began. . . . . 5-7-'11 — 11 days
♀ gorged off *L. Americanus*. . . . . 29-6-'11
Oviposition began. . . . . 22-7-'11 — 23 days
♀ gorged. . . . . 29-6-'11
Oviposition began. . . . . 22-7-'11 — 23 days
Hatching began. . . . . 24-9-'11
L. alive (Longevity). . . . . 18-4-'12 — 6 months and 25 days

Notes on *Dermacentor albipictus* and *Dermacentor venustus,* illustrating the fact that the males remain on the host after the females have dropped off. These ticks were observed at Huntingdon, B.C., on April 19, 1911, on some horses imported from Washington, U.S.A., on the above date it was just three weeks since they had left the pine scrub timber. These ticks all came off one horse, three of them were *Dermancentor venustus,* and the rest all *Dermacentor albipictus.* I was informed that all the horses were heavily infested with gorged ♀ 's when they reached the boundary line, a few days before my visit.

TICKS COLLECTED.

4 ♂'s dead.
1 ♀ dead. (Ruptured.)
2 ♀'s alive. (1 semi-gorged.)
16 ♂'s alive.

Dermacentor albipictus.

Off horse, collected at Huntingdon, B.C., Februarp 26, 1912. The horse came from Dolores, Colorado, U.S.A., and left there in October, 1911, coming by the road all the way.

20 ♀'s
19 ♂'s
26 O's.

1 O, which was white in colour, was split open, and an almost perfectly formed female found inside. Another O was also split open, and an immature adult found inside. A number of other O's showed signs of ecdysis. This proves that *Dermacentor albipictus* moults upon the host.

Dermacentor variabilis.

1 ♀ collected off cow, Aweme, Manitoba.. . . . . 2-6-'10
Oviposition began.. . . . . 18-6-'10
Eggs hatched.. 14-8-10

A number were placed upon a rabbit, but none were recovered. Some were also placed on a chicken, they became extraordinarily active for a time, but soon left, and none appeared to take hold. All these of *D. variabilis* were collected by Mr. N. Criddle, of Treesbank, Manitoba.

1 ♀ collected off dog at Aweme, Manitoba.. . . . . 19-6-'10
Oviposition began.. . . . . 1 to 4-7-'10
Eggs hatched.. . . . . 21-8-'10
Placed on tame rabbit.. . . . . 26-8-'10

Between 27-8-'10 and 2-9-'10, 50 gorged larvæ were secured. On 7-12-'10 only 5 larvæ were found alive, none had moulted.

1 ♀ collected off dog at Aweme, Manitoba.. . . . . 19-6-'10
Oviposition began, laid 2,339 eggs.. . . . . 1 to 4-7-'10
Eggs hatched, 2,269 larvæ.. . . . . 22-8-'10
L alive (longevity).. . . . . 19-1-'11
All dead.. . . . . 26-1-'11

Collected off dog at Aweme, Manitoba.. . . . . 25-5-'11
2 ♀'s oviposition started.. . . . . 12-6-'11
Oviposition finished.. . . . . 21-6-'11
♀'s died.. . . . . 26-6-'11
Had not hatched up to.. . . . . 2-11-'11

♀'s gorged off dog at Aweme, Manitoba.. . . . . 25-6-'11
Oviposition began.. . . . . 5-7-'11
Eggs hatched.. . . . . 26-8-'11
All dead.. . . . . 2-11-'11

1 ♀ gorged off dog at Aweme, Manitoba.. . . . . 6-7-'11
Oviposition began.. . . . . 16-7-'11
Eggs hatched.. . . . . 26-8-'11
Put on rabbit, but did not attach (in cold room).. . . . . 1-11-'11

1 ♀ gorged off dog at Aweme, Manitoba.. . . . . 6-7-'11
Oviposition began.. . . . . 16-7-'11
Eggs hatched.. . . . . 26-8-'11
Put on rabbit.. . . . . 10-2-'12

L's came off gorged—

1 on . . . . . 13-2-'12
73 on . . . . . 14-2-'12
26 on . . . . . 15-2-'12
20 on . . . . . 16-2-'12

These ticks look as though they are going to moult. The cage and room, &c., in which the rabbit was put, were warmed before the ticks were put on. In my opinion my former failures were largely due to the animal being in too cold surroundings.

Haemaphysalis leporis palustris.

1 ♀ gorged off *L. americanus,* Aweme, Manitoba . . . . . 13-5-'10
Oviposition began . . . . . 1-6-'10
Eggs hatched . . . . . 18-7-'10

Ticks were put on tame rabbit, but did not attach.

7 L's gorged off *L. americanus,* Mount Lehman, B.C. . . . . 10-8-'10
Hatched between . . . . . 8-10-'10 and 5-5-'11

6 O's, 1 dead larvæ. (Four moulted skins secured.) These ticks were kept in a vial with a moist rag, the rag was quite dry when the vial was opened, and the ticks were all dead.

1 ♀ gorged off *L. americanus,* Peardonville, B.C. . . . . 17-5-'10
Oviposition began . . . . . 25-5-'10
Eggs did not hatch.

♀'s gorged off *L. americanus,* Aweme, Manitoba . . . . . 17-7-'11
Oviposition began . . . . . 23-7-'11
Eggs hatched . . . . . 6-9-'11
Still alive . . . . . 9-2-'12
Placed on tame rabbit . . . . . 12-4-'12
L. came off tame rabbit gorged . . . . . 10 on 17-4-'12
44 on 18-4-'12
17 on 19-4-'12
36 on $\begin{matrix}20\\21\end{matrix}$ -4-'12

12 O's gorged off *L. americanus,* Aweme, Manitoba . . . . . 17-7-'11
4 hatched . . . . . 15-8-'11

32 O's collected off *L. americanus,* Aweme, Manitoba . . . . 17-7-'11
Placed on tame rabbit . . . . . 24-7-'11
4 gorged . . . . . 29-30-7-'11
2 hatched . . . . . 21-9-'11
1 hatched 26-9-11

All ticks from Aweme, Manitoba, were collected by Mr. N. Criddle.

LIST OF TICKS CAPTURED.

Genus Ixodes.

Ixodes angustus, Banks, Det. S. H.
Numerous specimens of ♂ ♀ O. L.
Hosts: *Scirius douglasi,* and *S. L. vancouverensis, Lepus americanus,* rats and mice.
Locality, Mount Lehman, B.C., and Duncans, Vancouver Island, B.C.

Ixodes texanus, Banks, Det. Nuttall.
4 ♀'s, 1 O, 1 L. off Procyon lotor.
Locality, Mount Lehman, B.C., 16-1-'10, and Bella Coola. 28-12. New to Canada.
Ixodes hexagonus, Leech. Det. Nuttall.
1 ♀, off weasel.
Locality, Mount Lehman, B.C., 27-1-'11. New to Canada.
Ixodes pratti, Banks, Det. S. H.
2 ♀'s off dog and cat.
Locality, Milk River, Alta., July, 1911. (Coll. Dr. A. Watson). New to Canada.
Ixodes ricinus, L. Det. S. H.
2 ♀'s off dog and man's arm.
Locality, Maple Bay, B.C., 25-12-'10, and Shawnigan Lake, 11-11-'10. (E. M. Anderson, coll.)

Two other species of Ixodes have been captured, of which the identity is at present undecided.

Genus Haemaphysalis.

Haemaphysalis punctata. C. and F. Det. Nuttall.
Numerous specimens of ♂ and ♀'s.
Locality, Manitoba. Coll. by Dr. J. D. Ross on many occasions.
Haemaphysalis leporis palustris. Packard, Det. S. H.
Numerous specimens of ♂, ♀, O, L.
Locality, Aweme, Man. (N. Criddle, coll.) and Mount Lehman, and Nelson, B.C. New to Canada.

Genus Dermacentor.

Dermacentor variabilis. Say, Det. Nuttall.
Numerous specimens of ♂ and ♀.
Hosts, Dog, cattle and man.
Locality, Aweme, Man. Coll. N. Criddle.
Dermancentor occidentalis, Neumann. Det. S. H.
4♂'s, and 3 ♀'s.
Hosts, *Lepus americanus.*
Locality, Treesbank, Man. Coll. N. Criddle.
Dermacentor venustus, Banks. Det. S. H.
Hosts, cattle, horses, man.
Locality, Kaslo, Pilot Bay, Osoyoos, and Huntingdon, B.C.
Dermacentor albipictus, Packard. Det. S. H.
Numerous specimens of ♂, ♀ and Os.
Hosts: horses, cattle, *Odocleus lemionus, Odocleus columbianum.*
Locality: Huntingdon, Peardonville, Vancouver Id., and Lillooet.

Genus Amblyomma.

Amblyomma americannum, L. Det. S. H.
1♂
Locality, captured on grass in muskeg. Aweme. Man. (N. Criddle, coll.)

References—

Neumann.—Revision des *Ixodidés.*
Hooker.—The geographical distribution of American ticks.
Banks.—Revision of the *Ixodoidea* of United States.
Hadwen.—The finding of *H. puctate.* 'Canadian Entomologist,' July, 1910.
Nuttall and Warburton, &c.—Ticks, Part II., 1911.

I am indebted to Professor Nuttall for his help and determinations.

NOTE.—Owing to Dr. Stile's new classification of the Dermacentors, it is possible that some of the species recorded above may not prove to be correct, but will at any rate fall in with his three main classes.

I have the honour to be, sir,

Your obedient servant,

SEYMOUR HADWEN,
1st Assistant Pathologist.

The Veterinary Director General,
Ottawa.

APPENDIX No. 10.

A. WATSON, V.S. , SECOND ASST. PATHOLOGIST.

Quarantine and Experimental Station,
Lethbridge, Alta., March 31, 1912.

To the Veterinary Director General,
Ottawa.

Sir,—I have the honour to submit my report for the year ending March 31, 1912.

As in former years, the greater part of my work has been in connection with Dourine or Maladie du Coït, (a) in further research and experimental work at the Quarantine and Experimental Station, Lethbridge, and (b) in controlling or dealing with outbreaks of the disease on notification being given me by the Chief Inspector for Alberta.

Aside from this I assisted the inspector at Cardston in an outbreak of Glanders, in the testing of 45 horses and in the destruction of the 5 reactors. A suspected case of Glanders from High River, ordered by the Veterinary Director General to be held at this station for 1 year, was isolated here since June 25, 1910, was tested on June 6, 1911. reacted and was destroyed on July 13. This case has already been reported in detail by Dr. Hilton, who, with Dr. Hargrave, was present at the testing and post mortem examination.

In the absence of the inspector in charge of the Lethbridge district I inspected 1,715 cattle in quarantine for Mange, and in accordance with special instructions received, permitted their removal and shipment under license.

I also dealt with an outbreak of Hog Cholera in the Lethbridge district and directed the slaughter of the 230 hogs on the affected premises.

During the year I inspected for Dourine 1,705 horses, including 93 stallions, found 7 animals affected with the disease and caused their destruction. Those destroyed were located as follows: 1 at Raymond, 1 at Stirling, 1 on the Peigan Indian Reserve, and 4 in the High River district.

DOURINE.

The fact that occasional outbreaks of Dourine are still to be met with in Alberta and Saskatchewan does not indicate negligence on the part of your officers who have been detailed to deal with previous outbreaks, but rather that there are a number of tolerant or immune carriers of the infection, which do not offer the slightest clinical evidence of such infection, and which, therefore, it is quite impossible to recognize under natural conditions and by the ordinary means of a symptomatic diagnosis. The experimental work on dourine which was commenced at this station in the year 1905 by Dr. S. Hadwen and carried on by me since November, 1906, up to present date, has given us a fairly complete record of the disease as regards its nature and cause, pathogenecity, symptoms, course and duration, and, among other things, it has brought to light a number of important facts not only of scientific value and interest but bearing directly upon our ability and our inability in diagnosis and consequently in exercising efficient means of control and stamping out.

In 1904 and in 1905 Dr. Rutherford made note of the apparent mildness of many cases of infection in this country; he drew special attention to this in his various

reports and made comparisons with the dourine of Asia and Africa which seems, he says, 'from all accounts, to run a definite course, the symptoms throughout being fairly well marked and the termination almost invariably fatal within three years at most.' Dr. Rutherford suggested that in this country where climate and other conditions are so different the virulence of the disease might become so modified and less fatal as to render recoveries more frequent; at the same time he gave warning that unless the recovery is complete and permanent 'it will be certain to render recognition more difficult and favour the perpetuation of the contagion in unsuspected chronic cases likely to cause periodical outbreaks of a more virulent type.' He saw the necessity of gaining precise and certain knowledge in this connection and ordered that a number of these mild or tolerant cases, some of which I think he himself selected, be held for a long period of observation and experiment. This was in 1905; the majority of these animals are surviving—7 years later. Others have been included during the intervening period and supplemented with cases that have survived experimental infection (the latter having the advantage of a complete history). Typical Dourine is well known and easy to recognize, needing no further description, but the principal historical facts concerning these typical, tolerant or recovered cases extending over such a lengthy period should be of much value and interest. I submit them separately, as an appendix, as Part I of a 'Further Report on Dourine'.

It is possible to draw a comparison between this experimental herd of horses, which includes many cases of infection naturally acquired as well as experimentally, and other herds or breeding studs in the country figuring in an outbreak of dourine, for the conditions of the experiments have in many respects been precisely similar to those that obtain under ordinary and natural conditions among horse owners. We have among our surviving animals at this station horses that have carried an infection for varying periods of time, extending in some cases to several years, without their betraying any definite or diagnostic sign of infection; also, animals which, after arriving at a certain stage of tolerance, show themselves more or less immune—repeated 'covering-contact' with infected stallions and inoculations of virulent strains of dourine-trypanosomes very rarely causing a recrudescence of symptoms or a visible reaction, and even then a very slight one. There is every likelihood that now and then a similar non-clinical 'carrier' exists among infected horses in the country, remains undetected and in later years, or when times and conditions are favourable, becomes the source of a further outbreak. To lessen this danger it has been necessary to enforce regulations prohibiting for one, two or more seasons, as seems advisable, the breeding of any animal which is suspected of having had 'covering-contact' with an infected animal; but even after that length of time and though the animal has continued in good health, it is, strictly speaking, unwarrantable to certify that a tolerated infection is not being carried. However, there must be a limit to the period of quarantine or detention, or the preventive measures would entail a more serious financial loss on the owners than the disease itself, but even as it is the prohibition of breeding when a large number of mares is concerned is the step that is most dreaded by owners and is apt to be the cause of untoward delays in obtaining reports or information of suspected cases.

The history of Dourine in any country where it has been known to exist does not furnish evidence that the killing of infected animals, depending wholly upon a symptomatic diagnosis, has sufficed to eradicate the disease. Announcements to that effect are, sooner or later, found to be premature, as shown by recurring or fresh outbreaks which cannot be attributed to importations from another country. A specific means of diagnosing non-clinical cases becomes not only essential for the complete success of a policy aiming at eradication, but has the great additional advantage of permitting a decision to be reached in a comparatively short space of time and of reducing to a

minimum the period of the prohibition of breeding. For several years past this has been one of the principal objects of the dourine experiments at this station. The work has been pursued under most trying and difficult conditions, the laboratory building and equipment being totally inadequate for carrying on such work under the exact and constant conditions that it properly demands. However, progress was made and results were slowly accumulated which I considered of such importance as to justify me in applying to you for four months leave of absence in order to do some work in European laboratories, to familiarize myself with improved technical methods and the latest applications of serum-diagnosis, and at the same time subject my own methods and experimental results to the criticism and comparison of competent authorities. This leave of absence was granted me, Dr. Evans, of the Biological Laboratory staff of Ottawa, relieving me and taking charge at this station. I visited the principal veterinary laboratories in England and Germany; in Berlin, through the privileges afforded me by Professor Ostertag and the President of the Kaiserlich Gesundheitsamt I went to work in the Imperial Laboratories where specific methods of serum-diagnosis were being practised in connection with Dourine, Glanders, Contagious Abortion, Anthrax, &c.

The employment of these determinative methods constitutes the most exact and definite mode of diagnosis at present known to science; it is being rapidly adapted to more general use in health departments and will, I am convinced, have a wide field of usefulness in veterinary control work.

I wish to respectfully and earnestly recommend that this station be placed upon a permanent footing and provided with a properly equipped laboratory for the investigation of diseases of animals that are of especial importance to the live stock industries of western Canada, and especially for the serological diagnosis of Dourine and any other diseases in which serum-diagnosis offers the most suitable and practical means of efficient control.

Part II. of my 'Further Report' will deal with the serum diagnosis of Dourine. I am holding this back for completion and final conclusions until such time as I can make a final test of all experimental animals at this station with any others that may be available and with a proper number of healthy controls.

I have the honour to be, sir,

Your obedient servant,

A. WATSON,
Ass't Pathologist.

APPENDIX No. 11.

SPECIAL REPORT ON HOG CHOLERA BY A. E. MOORE, D.V.S., CHIEF TRAVELLING INSPECTOR.

Ottawa, November 13, 1911.

Dr. J. G. Rutherford, C.M.G.,
Veterinary Director General,
Ottawa.

Sir,—I have the honour to inform you that in accordance with your request, I have prepared a brief report with reference to outbreaks of hog cholera which I have dealt with, the origin of which is undoubtedly due to the feeding of uncooked city garbage and hotel swill.

The first outbreak of this kind that came to my notice occurred at Sudbury, Ont., in June, 1903. Four (4) premises were involved. 85 hogs died and 14 were killed. Two of the owners were hotel men, feeding the swill from their own houses; the third was a woman feeding swill collected around the town, and the other was a butcher who bought a lot of hogs from this woman. There was absolutely no other source of infection traceable. All the other hogs in the community were healthy and no outside hogs had been recently introduced into these herds.

In November, 1903, there was an isolated outbreak in a herd at Collingwood, Ont.; no source of infection could be traced, but the owner was feeding the refuse from the packing-house. At this time there was more or less hog cholera scattered throughout western Ontario, and it is quite possible that infected hogs may have been sent to the Collingwood packing-house.

In August and September, 1908, another outbreak occurred at Sudbury and Copper Cliff, starting on two farms both feeding slaughter-house refuse and hotel swill. At first it was suspected that the disease was brought from near Wallaceburg, Ont., but a careful investigation was made on the premises where the hogs originated at Wallaceburg and no trace of hog cholera was found.

In August, 1908, hog cholera occurred on a farm at Toronto; 400 hogs died and 717 were slaughtered. The following is an extract from my report on this case:—

'Mr. Wilson (the manager) informed me that he had not bought any hogs for nearly a year, which were then some boars from Mr. Flatt, of Hamilton; no other hogs have come in contact with his since then.

'Mr. Wilson feeds his hogs on hotel refuse and this refuse contains nearly every conceivable thing, pork rinds, ham and shoulder bones, bacon; chicken and other fowl intestines, beef refuse, mutton and veal refuse, besides all kinds of vegetables and slops.

'We are at a loss to know the origin of this outbreak unless it came through contaminated food.'

In December, 1908, another outbreak occurred near Toronto, where 73 hogs died. No other source of infection could be attributed except from feeding the uncooked city swill.

In January, 1909, two more outbreaks occurred near Toronto. No source of infection could be discovered and both parties were feeding uncooked hotel swill. These two premises were several miles apart and no communication between them.

In September, 1909, quite a serious outbreak of hog cholera occurred at Ottawa. Fifteen (15) premises were involved, 170 hogs killed and 54 died. In every instance garbage-fed hogs were the victims; absolutely no other source of infection could be found. Farmers' hogs in the same neighbourhood, which were never fed garbage, remained healthy.

Later, in September of 1909, I was called to Toronto to investigate an outbreak of hog cholera at Weston, three hundred and sixty-five hogs being involved. There were no contacts or recent importations. The hogs were fed on uncooked hotel garbage from Toronto.

I carefully examined the garbage in both the Toronto and Ottawa outbreaks and I found a great many uncooked portions of pork, such as rinds from bacon and ham, sausages, spoiled pork chops, roasts, and portions of ham and shoulders. I found in Toronto whole strings of raw, sour, mouldy sausages. The owner informed me that it was a frequent occurrence to find a bushel basket full in their garbage collections.

In August of the present year an outbreak occurred at Sault Ste. Marie and was principally dealt with by Inspector Perdue. I visited the Soo in September and I found, as did Dr. Perdue, that the outbreak was entirely among swill-fed hogs, and those in contact with them. No other source of infection could be found. Farmers' hogs in this neighbourhood not fed on garbage, remained healthy. The disease was found on twelve premises; 95 hogs died and 260 were killed.

Last September I visited Winnipeg, Man., on account of hogs dying of hog cholera near that city. In company with Inspectors McGilvray and Macintosh I made a careful investigation and in every case found that uncooked garbage-fed hogs were the ones affected. There was absolutely no other source of infection that could be found.

Three outbreaks occurred a little later at Helen Mines, Ont. At first it was thought that the disease might have been taken there from the Soo. This might have been true in one case but the other two of these outbreaks were, as far as I could determine, not in contact at all with the Soo hogs, but were fed on the swill from the railroad construction and mining camps.

In October of this year quite a serious outbreak of hog cholera occurred at Fort William and Port Arthur, and is reported by me as follows:—

'Immediately on my arrival and accompanied by Dr. Fraser, I visited some of the premises where hogs were dying and found the disease to be undoubtedly hog cholera.

'This outbreak, in addition to those at Winnipeg, Sault Ste. Marie and Kenora, is confined wholly to hogs fed on uncooked garbage. The disease started almost simultaneously on all the different premises in this district; there was absolutely no communicating or exchanging of hogs among these people, and they were scattered in all directions.

'About the last of August or the first of September the butchers ran very short of local pork and large shipments were rushed in from Winnipeg. It was about three or four weeks from this date, as far as I can learn, that the first hogs began dying near Port Arthur. I was told that a large quantity of United States pork loins came into Canada, as well as their cooked and cured meats.

'I made a very careful investigation of the whole district in company with Inspector Fraser, with the result that 622 hogs were killed on 24 premises, valued at $5,500. Four hundred and seventy-five (475) hogs died previous to our visits.

'The garbage fed hogs in this district have *all developed* the disease, with the exception of one lot. I quarantined these hogs and ordered the owners to stop feeding garbage, according to section 8 of the Regulations.'

I made an inspection of a large number of hogs not fed on the garbage near Fort William and Port Arthur, but no evidence of hog cholera could be found.

You will notice that the western outbreaks occurred quite closely together; the one at Sault Ste. Marie started in August, at Winnipeg in September, at Kenoraa and

Fort William the first part of October. Immediately previous to these outbreaks a large quantity of outside pork was shipped into these towns by the Winnipeg packers.

In conclusion I wish to say that in my dealing with hotel swill fed hogs I have found the most repulsive conditions. The premises, with the exeeption of a very few, were in a most unsanitary condition; many of them were indescribably filthy, and the stench almost unbearable; millions of flies swarming around, rats, dogs and crows feeding off the decomposed garbage, in fact everything reeking in filth.

I believe that this material should not be allowed to be fed except under strict supervision, not alone from the serious danger of spreading hog cholera infection, but also from a sanitary standpoint.

I have the honour to be, sir,

Your obedient servant,

A. E. MOORE,
Chief Travelling Inspector.

APPENDIX No. 12.

INTERNATIONAL COMMISSION ON THE CONTROL OF BOVINE TUBERCULOSIS.

Ottawa, November 1, 1911.

To the Honourable Martin Burrell,
Minister of Agriculture
Ottawa, Ont.

Sir,—I have the honour to present herewith a brief compilation of useful facts regarding animal Tuberculosis for the special information of farmers and others interested in live stock.

This treatise, which is devoid of technical terms, has been prepared by the International Commission on the Control of Bovine Tuberculosis, as a supplement to its first report, it being thought desirable to disseminate, as widely as possible, among those most concerned, accurate information regarding the disease.

I would recommend that this be printed for general distribution.

I have the honour to be, sir,

Your obedient servant,

J. G. RUTHERFORD,
Veterinary Director General and Live Stock Commissioner.

PRIMER ON TUBERCULOSIS.

Facts for Farmers and others about this Disease.

Tuberculosis is a widespread disease affecting animals and also man.

Human beings and cattle are its chief victims, but there is no kind of animal that will not take it. Hogs and chickens are quite often affected; horses, sheep and goats but seldom, while cattle are the most susceptible of all animals.

NATURE OF THE DISEASE.

Tuberculosis is contagious or 'catching.' It spreads from cow to cow in a herd until most of them are affected. This may not attract much notice from the owner as the disease is slow to develop, and a cow may be affected with it for several months, and sometimes years, before any signs of ill health are to be seen.

This slow development is the chief reason for the great loss it causes to the farmer. He does not suspect its presence in his herd until perhaps a large number are diseased. If the disease developed rapidly and caused death in a few days, the owner would soon take steps to check its progress and protect the rest of his herd. Tuberculosis is slow and hidden in its course and thus arouses no suspicion until great damage is done.

HISTORY.

Where did tuberculosis come from? We do not know. History records it from the earliest times.

Over a century ago, its contagious nature was suspected and many facts were recorded to prove that it must be 'catching.' Doctors differed about it, and for a long time the question was hotly disputed. Finally it was settled by Dr. Robert Koch, a distinguished German physician, who discovered the germ of the disease in the year 1882, and named it *Bacillus Tuberculosis*. He proved by experiment that the disease is produced by these germs and without them the disease cannot be produced. It is now universally admitted that tuberculosis is a contagious disease and may be transmitted from animal to man.

In America the disease was introduced with early importations of cattle and has been with us ever since. Modern methods of transportation by rail and water have spread the disease from one end of the continent to the other. No part of the country is entirely free from it, but it is more prevalent near the great centres of population than in the remoter parts.

IMPORTANCE.

The importance of the disease must be estimated from two points of view, first, the loss it entails upon the cattle owner, and second, the danger of communication to human beings.

Consider first its effect upon the pocket of the owner of cattle, whether farmer, breeder or dairyman. A serious percentage of the dairy cows of the continent are affected and the disease is found in even a larger percentage of dairy herds.

The disease is commoner in some regions than in others.

It is no uncommon thing to find as many as 70 per cent or 80 per cent of the cows in a herd diseased. These animals will be in various stages of the disease, some recently infected showing no sign of ill health, others badly diseased, but outwardly appearing healthy, while a few are evidently breaking down and wasting away.

The loss to the owner is evident when a cow dies of the disease, or when an apparently healthy cow is slaughtered for beef and found so badly affected as to be unfit for food.

The calves in such a herd do not long remain healthy. They catch the disease before many months old and are a source of loss instead of gain.

Although the disease is most frequently found in herds that are more or less closely confined, such as dairy herds and pure bred cattle, other herds are by no means free from it. Even range cattle are sometimes affected and the infection spreads in spite of the open air life of the cattle.

Tuberculosis is common among hogs. The public abattoirs report that a serious percentage of all hogs inspected is found to be tuberculous.

The aggregate of these losses among cattle and hogs is enormous, amounting to millions of dollars every year, besides materially decreasing the food supply of the country.

Turning to the other aspect of the case, the danger of infection of human beings with tuberculosis from cattle, we have only to consider a few facts to realize its vital importance to every community.

Milk is the staple food of infants and young children and is usually taken in the raw state. If this milk is from a tuberculous cow, it may contain millions of living tubercle germs. Young children fed on such milk often contract the disease, and it is a frequent cause of death among them.

Meat from tuberculous cattle is not so likely to convey the infection for several reasons. It does not so frequently contain the germs, cooking destroys those that may be present, and lastly, meat is not consumed by very young children.

SYMPTOMS.

Before describing the symptoms or signs by which tuberculosis in recognized or suspected in a living animal, it is well to state that there is no symptom that can be relied on with certainty. Any of the symptoms may sometimes be caused by some other disease, and not one of them is characteristic of tuberculosis alone.

Many of the symptoms that are relied on by the human physician in reaching his opinion are not available in examining cattle. The thickness of the skin and chest wall, for instance, makes it difficult to detect a diseased condition of their lungs by listening to the sounds made in breathing, whereas this is comparatively easy in human beings.

It must also be clearly remembered that cattle may be very badly diseased and yet show no symptoms of ill health. They may be fat and sleek, looking the picture of health, while their lungs and other organs are full of tubercles. Such cases can only be detected by the tuberculin test.

As tuberculosis may attack almost any organ of the body, we may have in each case the symptoms connected with the part affected, as well as those affecting the general state of the body as a whole. We will take up in detail each of the more important symptoms suggestive of the disease.

Unthriftiness.

The animal is not doing as well as it should for the care and feed it is getting. Its coat is rough and its skin has lost its suppleness, and feels harsh and thick.

Loss of Flesh.

Along with the unthriftiness is noticed a gradual loss of flesh; the animal gets thinner from week to week. It appears to be pining away, and such cows have been known to dairymen for a long time under the name of 'piners,' or 'wasters.' After a time they are reduced almost to skin and bone.

Cough.

This symptom is only present when the disease is attacking the lungs or some part of the breathing organs. It is not a loud, sonorous cough, but rather a subdued and infrequent one, and may be heard only at such times as when the stable is first opened in the morning, or when the animal is driven. At a later stage of the disease it may be heard at any time of the day. Cows do not usually appear to cough up anything. This is because they do not spit. Most of the material coughed up from the lungs is swallowed, but many tuberculosis germs escape from the mouth in the form of spray or are discharged from the nose.

Enlarged Glands.

Enlargements in the region of the throat, especially when they cause difficulty in breathing, are very apt to be due to tuberculosis.

Loss of Appetite.

This symptom is not seen until the latter stages of the disease, when the animal is evidently wasting.

Bloating.

Sometimes the diseased glands in the chest prevent the usual passage of gas from the paunch to the mouth by pressing on the gullet. In this case the cow suffers from bloating and the paunch is often greatly distended with gas. This, however, is not a very frequent symptom.

Diarrhœa.

Looseness of the bowels or 'scouring' is seen in cattle affected with the disease in the bowels. This kind of scouring cannot be cured by any known treatment.

Hard Lumps in the Udder.

When tuberculosis attacks the udder, no change can be detected at first, but after a time hard lumps can be felt in some parts of the organ after it is milked out. Milk from such an udder must not be used, as it is almost certain to be teeming with germs of the disease.

POST MORTEM APPEARANCES.

When the carcass of a cow affected with tuberculosis is opened, the disease may be found in any part of the body. Lumps (tubercles) may be present in the substance of an organ such as the lung or liver, or they may be growing on the surface. These lumps may be so small as to be scarcely noticeable, or they may be as large as the closed fist, or even larger. If one of the lumps is cut open, the inside is yellowish and grits on the knife like sand, or else is of a cheesy nature, soft and creamy or hard and dry.

The lung is a favourite place for tubercles, and should always be examined. Lymph glands are often the seat of tuberculous changes. When healthy a lymph gland is a little rounded body, not much larger than a good sized bean, the largest only the size of one's thumb. They are found all through the body and when healthy are so small as to attract very little attention. Tuberculosis may cause them to grow to an enormous size, sometimes as large as a child's head. In this condition they are similar to the tuberculosis lumps already described. Those lying between the lungs and in the throat are the most frequently affected.

Tubercles may be found in any part of the body, glands, lungs, liver, bowels, kidneys, womb, udder or even bones. The muscles and skin are seldom affected.

THE TUBERCLE BACILLUS.

The germ of the disease, the tubercle bacillus, is a tiny, slender, rod-shaped body. Several thousands of them placed end to end would be needed to measure an inch, so that they are quite invisible to the naked eye. A powerful microscope is needed to see them.

Once the bacillus has gained lodgment inside the body of an animal, it begins to grow and multiply. It gets longer, and when full grown, divides crosswise, making two out of one. Each of these goes through the same process, the two become four, the four eight, the eight sixteen, and so on indefinitely.

This multiplication takes place quite rapidly when conditions are favourable, a few hours only being required for the birth of each generation. Nature, however, does not permit this process to continue long without offering some resistance. The forces of the body are aroused to action and a battle begins between the tissues of the body and the army of the invaders.

The first line of defence is composed of the white cells of the blood which hurry to the scene of action and endeavour to destroy the invaders by eating them up. Sometimes they are successful and the bacilli are destroyed, the infection checked. Often they fail in their object and are themselves destroyed and the multiplication of the germs continues.

The second line of defence is found by the cells of the tissue invaded by the germs. These cells arrange themselves in a circle around the germs and try to form a living wall between them and the rest of the body. This barrier gradually becomes thicker and thicker and forms a little hard lump or tubercle, from which the disease gets its name. If this wall is complete and successfully imprisons the bacilli, these gradually die and the disease in that particular spot is arrested.

Frequently, however, both these safeguards are overcome. The germs break through the barriers and are carried in the blood stream or lymph channels to other parts of the body. New points of attack are selected and the process begins again, but with less chance on the side of the animal. As the tubercles increase in number, the power of the body to grapple with them becomes less and less, and gradually the animal falls a prey to the disease.

The tubercle bacillus does not multiply outside the body of an animal. It can live for a long time in favourable surroundings, such as dark and dirty stables. Sunlight soon destroys it. Freezing does not hurt it, but it can only stand a moderate amount of heat; exposure to 149 degrees Fahrenheit for twenty minutes kills it. Protected by a layer of dried mucus, such as is coughed up from the lungs, it withstands drying, light, and ordinary disinfectants, but is readily killed by steam or boiling water.

HOW THE DISEASE SPREADS.

Sooner or later the tuberculous cow begins to give off the germs of the disease. The germs escape by the mouth and nose, the bowels, in the milk, and in discharges from the genital organs. When the germs are being given off in any of these ways, the disease is known as open tuberculosis.

Germs discharged from the mouth and nose are coughed up from the lungs and are sprayed over the food in front of the cow or are carried in the air for a time until they fall to the ground. Cows in adjoining stalls may take in these germs in the air they breathe or in the food they eat, and so contract the disease.

Germs discharged from the bowels are mixed with the manure, and may infect cattle and hogs that are allowed to pick over the dung heap. The practice of having hogs and cattle together in the same yard is sure to result in the infection of the hogs, if any of the cattle are affected. The germs in the manure come from matter that is coughed up and swallowed, and in some cases from tuberculosis in the bowels themselves. Manure containing tubercle germs may easily infect the milk. Particles of dried manure may fall into the milk pail from the skin of a dirty cow or be accidentally flicked off from the tail and fall into the milk. Straining the milk afterwards only removes the larger particles. The smaller ones, including the germs, remain in the milk.

When the udder is tuberculous, the milk contains the germs in vast numbers. Such milk may look and taste perfectly good, but readily transmits the disease to young animals. It is very dangerous to children. Hogs and calves are very readily infected by it.

HOW A HERD IS INFECTED.

Tuberculosis may be introduced into a healthy herd in a number of ways:

1. By the purchase of a bull or other animal that is infected with the disease. This animal may be apparently healthy at the time of purchase, but if it contains the germs, the disease may develop and spread to other cattle. New animals should only be bought from a herd that is known to be healthy.

2. By feeding calves with milk, buttermilk or whey that has come from tuberculous cows. A farmer may have a healthy herd, but if he brings home skim milk from a creamery and feeds it to his calves, he may give them the disease. Such milk should be rendered safe by boiling or pasteurizing it.

3. By showing cattle at fairs and exhibitions where no proper care is taken to keep out diseased stock, or to disinfect the stables.

4. By shipping animals in cars that have not been disinfected, as they may have recently carried diseased cattle.

5. By allowing cattle to graze with diseased ones, or to come in contact with them over fences.

THE TUBERCULIN TEST.

Tuberculosis develops so slowly that in many cases it is months, and sometimes years, before any symptoms are shown. During this period, the infected animals cannot be distinguished from the healthy in any ordinary way. There is a test, however, which does no harm to the healthy, yet detects the diseased ones practically without fail. This is known as the tuberculin test, because the substance used in making it is called tuberculin.

WHAT IS TUBERCULIN?

Tuberculin is a fluid containing the products of the tubercle germ without the germs themselves. As it contains no living germ, it cannot convey the disease. Great skill is required in its preparation. A special fluid (or culture medium) is prepared and the tubercle bacilli planted in it, great care being taken to keep all other germs out. The fluid is then placed in a special kind of incubator and kept at the temperature of the animal body. Under these conditions, the germs grow and multiply. Gradually the fluid becomes filled with the products of the germs. When the right point is reached the fluid is heated sufficiently to kill the germs which are then strained out. The remaining fluid is tuberculin.

Tuberculin does not harm healthy cattle, even in large doses, but on diseased animals it produces a marked effect. This is shown by a feverish attack which comes on about eight to twelve hours after the tuberculin is administered, lasts a few hours, and then subsides. This temporary fever is called the *reaction*, and animals which show it are called *reactors*. The value of the test lies in the fact that diseased animals react while healthy ones do not.

RELIABILITY OF THE TEST.

The tuberculin test in the hands of a competent and experienced man is much more accurate than any other method of detecting tuberculosis. The records of large numbers of tests made by Government officials show that, with certain precautions, it is accurate in 98 per cent of the reactions obtained. This gives a margin of a possible 2 per cent of error and this small number may be still further lessened by care in making the test. For practical purposes any animal that reacts must be considered tuberculous.

LIMITATIONS OF THE TEST.

The test should not be applied to cows that have just calved or are about to calve, as the temperature at this time is apt to vary considerably from the normal. For the same reason it should not be applied to any animal that is in a feverish condition from any cause.

The test fails to detect the presence of the disease in the animal that is very recently infected. The disease has to make a little progress before the test reveals its presence, and in the beginning of each case there is a period between the entrance of the germs into the body and the time when they have multiplied sufficiently for the test to reveal their presence. This is called the period of incubation and lasts from ten days to two months.

When the disease is far advanced and the animal is wasting, the test sometimes fails to detect it. This is not of much practical importance as such cases can generally be recognized without the aid of tuberculin.

PROTECTIVE INOCULATION.

For some years efforts have been made to discover a method of rendering cattle immune to the disease in such a way as men are protected from small-pox by vaccination. Up to the present these efforts have been only partially successful, and until the methods in use have been perfected by further investigations, they cannot be recommended as of practical use in the suppression of the disease.

SUPPRESSION OF THE DISEASE.

The first step in getting rid of the disease is to find out how many of the herd are affected by it. This is done by applying the tuberculin test. This will show a larger or a smaller number of the herd to be affected, and the proper course to pursue will depend largely upon the proportion of the reactors in it.

Suppose that only a few cattle react, say fifteen out of a hundred, or in that proportion. In this case the reactors are first carefully examined and if any of them show symptoms of the disease by coughing, loss of condition or any other of the signs by which the disease is recognized without the test, such animals should be slaughtered.

The other reactors should then be entirely separated from the healthy cattle. If possible they should be put in a separate building, but if this cannot be done, a tight partition should be built between the diseased and the healthy cattle and separate ventilation provided. The person who attends to the reactors should not go near the healthy animals, as he may carry the infection to them on his hands, clothes or boots. For the same reason, the feeding and watering must be done with separate utensils.

When at pasture, the reactors must not be put into a field where they can reach across a fence to healthy cattle. Whenever a calf is born among the reactors, it should be immediately separated from its mother and brought up by hand or on a healthy cow. The calf is usually born healthy, but would soon catch the disease from its mother if allowed to remain with her.

The milk of reacting cows may be used if it is first boiled or heated to a point sufficient to kill the germs. This heating to a point less than boiling it is called *Pasteurizing,* and is safe provided all the milk reaches the required degree of heat and is kept there sufficiently long. For this it is necessary to keep the milk for twenty minutes at 149 degrees Fahrenheit or for five minutes at 176 degrees Fahrenheit.

This system of dealing with tuberculosis in a herd was planned by Professor Bang, of Denmark, and has been very successfully followed in that country for some years. It has the advantage of allowing the reactors to be made use of while a sound herd is being built up. Under this system the sound herd increases in numbers as healthy calves are added to it, while the diseased herd becomes smaller as the reactors die off or are killed as open cases of tuberculosis. Finally a point is reached where only a few reactors remain and the owner will then find it to his interest to kill them rather than have the trouble of keeping them isolated.

Some time is required for the successful carrying out of the Bang system, and the owner must be prepared to follow it steadily and faithfully for the whole time that is needed, which may be several years. During this time, the healthy herd must be tested every six months and any reactors removed to the diseased herd. At the same time, a sharp lookout must be kept for animals showing definite symptoms of the disease. These should be destroyed promptly as they are the most dangerous source of infection.

DEALING WITH A BADLY INFECTED HERD.

Where the test shows more than half the number diseased a somewhat different plan is required than the Bang system. This herd is so badly affected that the non-reactors cannot safely be considered healthy. Many of them are sure to have been infected with the disease quite recently so that the test fails to detect it These will react at the next test and in the meantime may develop the disease so rapidly as to infect others. This will repeat the difficulty occuring at the first test, and it would be a long and tedious process of weeding before even a small but perfectly healthy herd could be established.

For these reasons it is better to treat such a herd as if it were entirely diseased, and to begin with the new-born calves to build up a healthy herd. The method from this point is exactly the same as the Bang system, except that as there are no healthy cows to act as foster mothers, the calves must be raised on pasteurized milk. At six

months old, the calves are tested and reactors are transfererd to the other herd. This plan was devised by a German veterinary surgeon named Ostertag, and is known as the Ostertag system. It is very successful when carefully carried out.

While getting rid of the disease by whatever system may be adopted, an animal should never be bought for the healthy herd unless known to be healthy. The tuberculin test should be applied and if possible the animal should be selected form a herd that is known to be free from tuberculosis New purchases should be isolated or kept apart from the healthy herd and if possible from each other for at least three months, when they should be re-tested to make sure they are healthy before putting them with other cattle.

SANITATION.

Dark, dirty, crowded stables are favourable to tuberculosis. Under these conditions the disease spreads rapidly and is only kept out with difficulty.

Clean, airy, well-lighted stables on the other hand, are unfavourable to the development of the disease. If brought into such a stable, it does not spread so rapidly and is not so difficult to get rid of as in the first case.

A well built, sanitary stable need not be made of expensive material or of elaborate design, but should have plenty of light, air and drainage.

Light is very important. Direct sunlight is a great destroyer of germ life. Tubercle bacilli soon die if exposed to sunlight. It is a disinfectant always ready to work without cost. Sunlight is also necessary to the health of animals. Men deprived of it for any length of time, as prisoners in jail, become pale and lose the appearance of health. Cattle that are constantly confined in dark stables become lowered in vitality and are ready to catch any disease with which they come in contact. For these reasons the cow stables should have plenty of windows on two or more sides if possible, so that the sunlight can reach every part of the interior some part of the day.

Pure air is also very important. In badly ventilated stables, the air is breathed over and over again, until it becomes more or less poisonous. Animals kept in such conditions become gradually reduced in vitality. This change may not be noticeable to the observer, but becomes apparent if the animal is exposed to disease. It readily contracts disease and does not recover from it readily.

Stables should therefore have plenty of air space for each animal. This requires the ceiling to be high, the stalls roomy and the passages wide. In addition to this ample air space, some way of changing the air in a stable must be provided. This is done by suitable openings in the walls and roof and comprises the system of ventilation.

VENTILATION.

Ventilation to be successful must provide for two things, first, the removal of the foul air from the inside and second, the bringing in of fresh air from outside the building. No system is good that fails to accomplish these objects, without causing unnecessary draughts.

The usual way is to bring in fresh air through open windows, and in cold weather, through ventilating shafts, which may be concealed in the walls or beneath the floor. The foul air is removed by open windows and by ventilating shafts from the ceiling to the roof, where they are usually protected by a hood. When both inlets and outlets are proportioned to the size of the building, there should be a constant circulation of air, and no sensation of closeness should be perceptible in the stable.

DRAINAGE.

Drainage removes the liquid refuse from the stable by suitable gutters and drains. It cannot do this unless the floor is water-tight, and concrete flooring is therefore recommended. Urine leaking through cracks in the floor until the soil beneath is saturated is a frequent source of foul odours and unhealthy stables.

CLEANLINESS.

Since the manure of tuberculous cattle often contains living tubercle germs in vast numbers, the importance of keeping it well cleaned out of the stable is readily seen. Such manure is not only dangerous to other cattle in the stable, but may be the means of conveying the disease to children. Often cows are seen with their flanks encrusted with dry dung. Parts often break off while the cow is milked and some of it is likely to fall into the milk pail. The larger lumps are strained out, but the smaller particles remain, and also the tubercle germs which are small enough to pass through any strainer. These stay in the milk and make it a fruitful cause of the disease in the young.

Stables should be cleaned out often and the manure put where it cannot be picked over by hogs or cattle. These animals are easily infected in that way. Cleanliness also includes keeping the walls and ceilings free from dirt, dust and cobwebs. These are all good resting places for disease germs.

Whitewashing the interior of the stable at least twice a year is a great aid to cleanliness, and also has a distinct effect in destroying disease germs. In many municipalities, dairy stables are required to be whitewashed at regular intervals, and it is a practice that should be universal.

MEMBERS OF THE INTERNATIONAL COMMISSION ON THE CONTROL OF BOVINE TUBERCULOSIS.

J. G. Rutherford, C.M.G., V.S., H.A.R.C.V.S., Veterinary Director General and Live Stock Commissioner of the Dominion of Canada, Ottawa, Canada; Chairman.

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Hon. W. C. Edwards, Senator, Canadian Parliament, Ottawa, Canada.

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SESSIONAL PAPER No. 15b

APPENDIX No. 13.

THE CONTROL AND ERADICATION OF GLANDERS.

By C. D. McGilvray, M.D.V., Winnipeg, Canada.

In dealing with this subject and presenting it for consideration, it is my intention to place before you certain features which have impressed themselves upon me, during the past seven years, while actively engaged in dealing with the control and eradication of glanders, through the use of mallein, among horses in the province of Manitoba.

While glanders has been considered, both by the veterinary profession and intelligent horsemen, as a disease which, on account of its nature, should be controlled and eradicated, still the 'bete noir' has apparently been as to what measures should be adopted and followed as a means of effecting this end with the least material sacrifice.

The various policies propounded and methods adopted have shown a wide divergence and the greater the magnitude, or scope, of the field under observation, the less tenable have many of them appeared.

Without entering into any apparent reiteration or descanting upon these, it would appear that the most common procedure in dealing with outbreaks of glanders had been directed towards animals showing plainly discernible clinical symptoms, such animals being destroyed, while other contact horses, if not manifesting clinical evidences of the disease, were often disregarded, or, at best, placed under quarantine restrictions as appeared exigent for a short time, at the end of which, if they did not manifest clinical symptoms of the disease, restrictions and observations usually terminated. It was not sufficiently realized that horses could be affected with occult, or concealed glanders, remaining in this latent condition even for several years and, while nevertheless diseased, might, to all outward appearances, be healthy. Therefore quarantining of itself, to be of any avail as to determining even possible freedom from the disease, would require to be for a much more extended period than was usually imposed.

Again when the necessary steps were taken to ascertain the actual condition as to health of contact animals, by the use of mallein, and where such animals reacted to the test, slaughter was not, in many cases, enforced, nor, on the other hand, were definite restrictions or limitations placed upon them.

This was the state of conditions which existed in the province of Manitoba prior to the year 1905, and, as a result, glanders had become widely distributed throughout the province with a marked increase in prevalency.

Through the efforts of Dr. J. G. Rutherford, C.M.G., Veterinary Director General for the Dominion of Canada, Manitoba was, during February, 1905, brought under Federal control, and placed under the operations of the Contagious Diseases of Animals Act. This responsibility having been assumed by Dr. Rutherford, the policy embodied in the regulations relating to glanders drafted by him was put into practical operation and consistently carried out as a means, if possible, of effectively dealing with and eradicating glanders from the province, the field work in connection with which I took charge of, under his directions, during February of the year 1905.

This policy, in brief, was that all animals affected, or suspected of being affected with glanders, should be inspected and submitted to the mallein test, and all which definitely reacted forthwith slaughtered, compensation being paid to owners as pro-

vided for by the Contagious Diseases of Animals Act, at the rate of two-thirds the animal's value, with a maximum valuation of $150 per head for grade animals and $300 for purebreds. Any animals giving doubtful or unsatisfactory results at the time of first test were not slaughtered but kept under close quarantine restrictions, and again submitted to the mallein test at the expiration of fifteen days from the time of the first test. If, upon retest, they proved negative they were released, while, on the other hand, if they reacted they were forthwith slaughtered and the owners compensated, as provided for.

In actual outbreaks of the disease when any of the animals under control were clinically affected, these, together with any other horses on the premises, were tested. All reactors were promptly destroyed and the owners ordered and instructed as to the satisfactory cleansing and disinfection of the premises by means of limewash and carbolic acid together with the disinfection of all other articles and utensils which might have been in use, to the satisfaction of an inspector. The animals which were negative to the first test, were placed under quarantine restrictions for a further test before being released. This retest was conducted at the end of fifteen days from the time of the first test, and if they again proved negative to the test, they were released, while, if any of them reacted, they were destroyed and the premises again cleansed and disinfected.

With the view of tracing the source of infection in outbreaks, owners were closely questioned as to the history of the various horses on their premises. Further searching inquiry was also made as to any possible contact, directly or indirectly, of other horses with the diseased animals, either adjacent or remotely situated. Upon receiving this information, which was carefully noted, steps were taken to trace up, locate, and deal with all horses and premises to which suspicion was thus attached, and such suspects were then submitted to the mallein test.

While this, as you will see, involved a considerable amount of labour and detail work, still it has shown itself to be an essential factor in the control and eradication of glanders.

The results of our work have shown us that in the control of glanders, efforts must largely be directed towards restricting all traffic and migrations of reactors and contact infected animals. Almost invariably where outbreaks of glanders have been found in what has hitherto been a healthy stud, such outbreaks have originated from and been caused by the introduction on to the premises of occult affected animals, which, at any time, were not showing any discernible clinical symptoms, but were to all outward appearances healthy.

The view has been somewhat prevalent that a horse affected with glanders may only be capable of transmitting infection when clinically affected either with a visible nasal discharge or farcy buds. Such, however, is erroneous. While no doubt clinically affected animals, especially those having a profuse nasal discharge, are more highly dangerous and infective than occult cases, nevertheless it must not be overlooked that many of the latter are affected with concealed lesions as of the nasal passages, larynx, trachea, or lungs, and in the case of the latter (concealed pulmonary glanders) the lesions may involve considerable areas having suppurating foci discharging bacilli which are in turn expelled by normal expiratory movements. Again, sooner or later, many of these become clinical. Thus all doubt should be removed as to the dangerous nature and infectiveness of a very large number of these occult cases.

In the clinical examination of horses for glanders, the condition of the submaxillary glands should always be carefully examined and an indurative, bosselated, condition of these glands, even in the absence of any visible nasal discharge or ulceration, must be regarded with suspicion. The absence of a visible ulceration of the nasal mucosæ does not by any means exclude the possibility of glanders being present, as even in clinical cases a visible ulceration on the septum or under the alax is not always present, ulceration being often situated higher up, and therefore invisible.

In connection with the foregoing statistics, it will be observed that, under the method followed preceding 1905, when only clinical cases were destroyed, the disease was on the increase.

Under the policy which was introduced and put into operation in 1905, attention was immediately directed towards all premises upon which cases of glanders had been destroyed, or reported during the preceding year. Curious as it may seem, almost invariably, among the contacts of cases previously dealt with, it was found that a very large number of these contacts had, in the meantime, developed clinically, hence the work during this year consisted largely in tracing up and dealing with the contacts of previous outbreaks.

During the year 1906, while the number of horses tested was slightly less than the preceding year, the number found to be diseased was less than one half.

During 1907 horse owners and practising veterinarians, now being entirely in sympathy with and having confidence in the work being done, began to report freely any cases to which suspicion might be attached, as shown by the consequent increase in number of horses inspected and tested, yet while the number of horses inspected and tested was considerably increased, the number found to be affected was very greatly diminished.

The same policy was consistently followed during the succeeding years with a more pronounced decrease each year in the number of animals found to be affected and destroyed, until, during this year, up to the present time (August 19, 1911) no cases of glanders have been detected.

In the carrying out of this work, as a result of careful observations, certain conclusions have impressed themselves upon us regarding the use and value of mallein, which would seem to be worthy of consideration.

THE USE AND VALUE OF MALLEIN.

In testing the clinically affected horses, they invariably, with the exception of a few cases which prior to injection had high temperatures exceeding 102° F., gave positive results, and showed well marked thermal reactions, exceeding 2° over the highest pre-injection temperature, accompanied by typical infiltration at seat of inoculation and associated in most cases, with constitutional disturbances as manifested by increased respirations and inappetence.

The cases having high initial temperatures (autogenetic) in the absence of a further thermal increase after injection, however, gave characteristic local reactions, associated with more or less constitutional disturbance.

Mallein therefore, in our hands, demonstrated an unmistakable affinity for clinical cases of glanders. Such being the case, no reason can appear to exist why this selective affinity should not be manitained when applied to occult cases.

The common acceptance of a reaction has been given as an increase in temperature of 2° over the average pre-injection temperature, associated with local and organic reactions. This, after all, to those who have given the matter serious consideration, is somewhat indefinite, if not misleading. A very important feature has apparently been overlooked in not keeping in view the fact that normal temperature is not a fixed quantity but varies in individuals according to environment, location, seasons, &c. Throughout many districts of western Canada, the normal temperature of horses presents a wide range, varying from 99° to 102° F. During the greater part of the year, the average normal temperature has been found to be about 101° F., just as many being found with temperatures over that mark as with temperatures below.

If any hard and fast rule was applied of an increase of 2° constituting a reaction, the individual with a temperature of 99° to-day would, to-morrow, as a result of mallein injection, if the temperature reached 101·5° F., be classed as a reactor. Nevertheless the temperature may even then be within a normal range. Again, horses frequently have temperatures of 99° and upon the succeeding day, without any

injection of mallein may present a temperature of 101° to 102° maintained during the entire day.

I am somewhat inclined to think that this is a pitfall into which many have fallen and may to some extent explain why they have encountered so many reactors which have never developed clinical symptoms and which, upon retest, fail to manifest any reaction and have been wrongly classed as 'ceased reactors.' In reality many such animals never reacted to the test as their temperatures after injection were still within a normal range and while possibly not altogether satisfactory, were not, in the true sense, reactors. It would seem, therefore, that, in the intelligent application and use of mallein, it is not only essential to determine the single individual's apparent normal temperature but also to determine the normal range of temperature for horses in the area under observation.

It is usually accepted and acknowledged by those engaged in dealing intelligently with mallein in the control of glanders that animals which have shown a slight, or doubtful, reaction to a first mallein test, may subsequently either fail to react or to do so but slightly, or, on the other hand, may even show a pronounced reaction, without, in the meantime, developing any external manifestations of disease. This fact has apparently given rise to a considerable amount of controversial comment. Close observations have led me to conclude that the animals which entirely fail, or cease, to react are usually those which have not given a characteristic reaction to a first test. Those which have shown a positively characteristic reaction to a first test seldom fail to react more or less to a second test, but may fail to react definitely to some subsequent test which may result, in some animals, from an acquired tolerance to mallein induced in them by repeated injections. It is advisable, I think, to consider ceased reactors, so-called, as a class comprising at least two distinct sub-classes, viz.:—

A Pseudo ceased reactors.

B. Authentic or actual ceased reactors.

Pseudo ceased reactors.—Under this heading may be considered all animals which have given a doubtful or non-characteristic reaction to a first test, but which fail or cease to react to subsequent tests. In the control work of glanders on a large scale, there will necessarily be found a large number of animals which, for some reason or other, may give doubtful results to a first test and which, upon retest may prove entirely negative. In the true sense these are not ceased reactors, as, in the first place, they had not given a characteristic or positive reaction and, upon proving negative to a second test, may as a general rule be considered innocent. This class has, to my mind, been largely drawn upon by those tending to disparage the value of mallein.

Authentic, or actual, ceased reactors.—In the true sense of the term, a ceased reactor is an animal which has given a characteristic or positive reaction to the test, but which has proved entirely negative, or failed to react, even typically, to subsequent tests. This class I do not consider to be at all as numerous as it is alleged by some, being of the opinion that included in this class by them are many which should rather be classed otherwise.

In the case of authentic, or actual, ceased reactors, whether from an acquired tolerance as a result of repeated malleinization, or a supposed recovery, I consider them as a dangerous class to which suspicion must be attached from the fact that out of their numbers arise individuals responsible for fresh outbreaks, many instances of which could be cited in substantiation thereof.

A very interesting feature which has been observed in connection with many of these so-called ceased reactors which have been kept under official supervision, is that having reacted more or less definitely to a first and second test, they may subsequently fail to react to third, fourth and further tests if made within intervals of thirty, sixty and ninety days, but if allowed to remain without being subjected to mallein for a period of twelve months or more, they then, when tested again, show a pronounced reaction.

In illustration I append herewith records dealing with the case of one of these ceased reactors:—

*During July, 1908, an outbreak of glanders was detected and dealt with by officers of the department at High River, Alta. Thirteen horses on the premises were inspected and tested, eight of which reacted and were destroyed. Of the other five, four were entirely negative while one, a black stallion named 'Fritz' reacted, but on account of the especial value to the owner, at his request, was held for further test.

RECORD OF TESTS OF BLACK STALLION "FRITZ".

Firs Test.

Temp. before injection July 13, 1908.		Temp. after injection July 14, 1908.			
3 p.m.	7 p.m.	7 a.m.	10 a.m.	1 p.m.	4 p.m.
100[4]	100[1]	103	103[3]	102[4]	102

Maximum swelling 3-in. x 4-in. No clinical symptoms present.

Second Test.

Temp. before injection Aug. 22, 1908.		Temp. after injection Aug. 23, 1908.			
6.30 p.m.	9.30 p.m.	8 a.m.	10.30 a.m.	2 p.m.	5 p.m.
100	100[4]	105[2]	105[2]	103[4]	104

No clinical symptoms present and owner still refused to have animal destroyed. During December, 1908 the owner had the horse tested privately. No official record of the test results, which were supposed to be negative.

*(I am indebted to Dr. Rutherford for placing the official records dealing with this case at my disposal.)

Fourth Test (third official test).

Temp. before injection Jan. 13, 1909.		Temp. after injection Jan. 14, 1909.				
2 p.m.	9 p.m.	7.30 a.m.	10 a.m.	1 p.m.	3.30 p.m.	7.30 p.m.
100	100	100[3]	100[2]	102	101[3]	101

Maximum swelling 2-in. x 2-in.

Fifth Test.

Temp. before injection Jan. 24, 1910.		Temp. after injection Jan. 25, 1910.				
6 p.m.	9 p.m.	5.30 a.m.	8.30 a.m.	11.30 a.m.	2.30 p.m.	5.30 p.m.
99[2]	100[1]	100[2]	100[2]	101[1]	100[4]	100

Maximum swelling 3½-in. x 4-in.

During June, 1910, arrangements were made by which this horse was procured from the owner and removed to the Quarantine Station at Lethbridge, where it was kept isolated under the supervision of Dr. A. Watson, one of the pathologists of the department. It was allowed to remain without being subjected to mallein for a period of about seventeen months and was then submitted to the test on June 6 and 7, 1911, by Dr. Watson in the presence of Drs. Hilton and Hargrave, also officials of the department. The results of the test are as follows:—

Temp. before injection June 6, 1911.			Temp. after injection June 7, 1911.				
7 a.m.	12 a.m.	10 p.m.	8 a.m.	10 a.m	1 p.m.	4 p.m.	10 p.m.
100	99[5]	101	102	103[2]	103[9]	103[4]	101[4]

Maximum swelling 7-in. x 7-in.

After injection there was present a slight lachhrymal discharge and tenderness of submaxillary glands, also slight *œdema* under the abdomen anterior to the sheath.

On July 13, this horse was destroyed at the Quarantine Station and a careful post mortem examination was made by the pathologist, Dr. Watson, in the presence of Drs. Hilton, Hargrave and Gallivan, veterinary inspectors of the department.

No clinical symptoms were in evidence and the horse was in fair condition prior to slaughter.

Post mortem.—Careful examination of the submaxillary lymph glands and of the mucosae lining the nasal passages, fauces, pharynx, larynx and trachea revealed no lesions. Of the cervical lymph glands some appeared hæmorrhagic; others showed slight pigmentation and slight calcified deposits. Bronchial glands apparently normal.

Lungs.—On the surface of the left lobe a typical glanders nodule was observed and many small hard bodies could be felt embedded in the parenchyma, which, upon section, were found to be calcified glanders nodules, varying in size from a pin head to small peas. Of the mediastinal glands the anterior ones showed calcified deposits. Spleen appeared normal. In the liver numerous typical lesions of glanders were in evidence, many calcareous nodules being situated under the capsule, one nodule of large size was encysted with a cavity containing pus; groups of encapsulated nodules with softening centres were embedded throughout the liver substance.

In determining a thermal reaction, I consider that where the temperature recorded at intervals of two hours from the eighth to the twentieth hour after injection does not reach and exceed 2°5° over the highest initial temperature within a normal range, and is unaccompanied by a definite typical reactionary swelling at seat of inoculation or marked constitutional disturbance, more especially where the acme has been reached before the twelfth hour after injection and begins thereafter to recede to the normal range, it is not a characteristic reaction from glanders infection. When the same degree of thermal reaction is obtained, accompanied by a definite local infiltration at seat of injection, and pronounced constitutional disturbance, it indicates a glanders infection.

When the thermal reaction reaches and exceeds 2°5° with the rise of temperature maintained from 8 to 20 hours after injection, presenting the highest peak from the twelfth to the eighteenth hour, associated with a reactionary infiltration at seat of injection, even in the absence of any marked constitutional or organic disturbance, it indicates a glanders infection.

In judging a typical local reactionary swelling, observations lead me to conclude that it depends not so much on the actual size as measured across its surface as on its nature as to shape, size, tenseness and presence of pain. The typical reactionary infiltration is nearly circular in outline, has a tendency to increase its area from the eighth hour after injection and, at the same time, extends to and involves the deeper seated, underlying muscular tissues, giving rise to an acute mycsitis over which the skin becomes adherent. To the touch it is tense, hot and extremely painful, and if the neck has been the seat of injection, cord-like swellings (lymphatic) in some cases, may extend to the shoulder, causing pain and difficulty of shoulder movement. When the infiltration assumes such a nature, I consider it a typical reactionary swelling irrespective of its surface measurement.

When an infiltration is not typical, it rarely exceeds a diameter of three inches and to the touch is found to be slightly painful, soft and movable, remaining superficial in the skin and sub-cutis, not extending to or involving the underlying muscular tissues, nor perceptibly increasing in area after the eighteenth hour and has a tendency to become absorbed and gradually disappear thereafter. It does not extend towards the shoulder joint nor cause stiffness of movement.

Oblong infiltrations should be carefully observed, as even when of large size, they are frequently not typical, being a dependent oedema, usually resulting from the

manner in which the injection has been made, causing an oblong fold to become inflated.

These oblong oedematous infiltrations should be differentiated from the cord-like swellings extending from a typical circular reactionary infiltration, as they tend to become more rapidly absorbed, do not present any of the other features such as extreme painfulness, are soft and movable and do not extend to the deeper seated muscular tissues nor cause stiffness of shoulder movement as is characteristic of the typical reactionary infiltrations.

In retesting horses which have given a more or less definite reaction to a first test, my experience has been that the local reaction at second test may be less pronounced and temperature acme more variable and, while in a few cases the temperature acme has been observed from about the eighth hour after injection, more frequently it remained in abeyance until at and following the fourteenth hour.

In actual outbreaks where any of the animals under control are showing unmistakable clinical symptoms, all contacts should be regarded as possibly infected. Those giving a definite and characteristic reaction to the test, clinical or otherwise, should be considered as diseased and dealt with accordingly. Those in which the result of the test is negative or non-characteristic should be held under proper restrictions for a further test within a reasonable time. This has been found quite satisfactory by us when conducted at the end of fifteen days. If, at this time, they prove entirely negative to the test, they may safely be considered as non-infected. While, on the other hand, if any react, they should be considered as diseased and dealt with accordingly.

Any contact animals having temperatures over the normal range unless some other well defined cause is in evidence to satisfactorily account for same, if upon testing, even in the absence of a further thermal increase, or a sudden drop or decline in temperature they exhibit a typical local infiltration at seat of injection, accompanied by constitutional disturbance, should be considered as incubatively affected.

The course, as outlined above, having been pursued and consistently carried out in our operations, has been fruitful in preventing secondary outbreaks, none of which have been encountered by us during the period under observation.

Disparagement as to the value of mallein has been made by some, who claim that animals suffering from certain febrile affections and conditions other than glanders may react. This needless to state is a wrong application. In the first place, in such cases the test should be deferred and not applied until animals are in a normal state, as even in the natural course of any febrile affection an increase in temperature might be encountered without the application of mallein and which, under mallein inoculation, may be wrongly ascribed to the injection. In the course of our work very many horses suffering from non-febrile maladies have been submitted to the test and characteristic reactions have not been obtained when they had not previously been in contact with glandered horses. Likewise in the case of febrile affections, without any previous contact with glanders, characteristic reactions were not obtained. Horses should be tested under natural and normal conditions and fed and watered as customary. Temperatures, however, should preferably not be recorded immediately after watering. Physiological increases in temperature may be induced in horses undergoing test during extremely sultry weather, if closely confined in ill-ventilated stables. During extremely cold weather they should be protected from undue draughts and chills and the body clothed if necessary. Exercise to any great extent should be withheld until the required period for recording temperature has elapsed, as any violent exercise very often perceptibly increases the temperature range. Fractious animals should also be properly restrained and controlled, so that the temperatures can be taken without undue excitability or resistance.

During the first two years of our work, much evidence accumulated from time to time as to infection being introduced by horses coming from other countries, so that during the early part of the year 1907, in order to lessen and prevent the possibility of fresh infection being introduced into Canada, the Veterinary Director General deemed it advisable to take measures guarding against such contingencies, as a result of which the quarantine regulations were amended to conform to the general intents of his glanders policy. In the case of animals entering from the United States, it was required that all horses, mules and asses must either be accompanied by satisfactory certificate of mallein test, signed or endorsed by a duly authorized inspector of the Bureau of Animal Industry of the United States Department of Agriculture, dated not more than thirty days prior to the time and date of entry, or if not so accompanied, such animals would be submitted to the mallein test by duly authorized inspectors of the Health of Animals Branch of the Department of Agriculture of Canada. At the same time the importation of unbroken, branded, or range horses, mules and asses was prohibited and, in compliance with the foregoing regulations, in addition to the number of horses mentioned as tested in field work, we have, as already stated, tested at boundary points in Manitoba, 14,850 horses and mules coming from the United States.

In conclusion, I would state that in connection with the control of glanders in the province of Manitoba, while the number of animals which it was found necessary to slaughter during the first few years of the work, was comparatively large, the decrease became rapidly pronounced and maintained and the measures taken to prevent infections from outside sources have so far proved satisfactory. It clearly indicates that the policy of eliminating, by the use of mallein, all reactors, both latent as well as clinical cases, when put into practical operation and consistently carried out, has the desired effect of eradicating glanders, and lapse of time will only tend further to show and prove that the policy involves the least material sacrifice.

APPENDIX No. 14.

REPORT OF THE DEPARTMENTAL COMMITTEE APPOINTED BY THE BRITISH BOARD OF AGRICULTURE AND FISHERIES TO INQUIRE INTO EPIZOOTIC ABORTION.

Part I.

EPIZOOTIC ABORTION IN CATTLE.

Copy of Minute of Appointment and Reference to the Committee.

I hereby appoint a committee to inquire by means of experimental investigation and otherwise, into the pathology and etiology of Epizootic Abortion, and to consider whether any, and if so, what, preventive and remedial measures may with advantage be adopted with respect to that disease.

The Committee will be constituted as follows:—

Sir Edward Strachey, Bart., M.P.
The Very Rev. Dr. John Gillespie.
Professor John McFadyean, M.R.C.V.S., M.B., B.Sc., Principal of the Royal Veterinary College.
Mr. William Hunting, F.R.C.V.S.
Dr. George H. Falkiner Nuttall, F.R.S.
Mr. Stewart Stockman, M.R.C.V.S., Chief Veterinary Officer of the Board of Agriculture and Fisheries.

And I hereby appoint Professor John McFadyean to be Chairman and Mr. James Ralph Jackson, M.R.C.V.S., of the Board of Agriculture and Fisheries, to be secretary.

(Signed) AILWYN E. FELLOWES,
President of the Board of Agriculture and Fisheries.

4 Whitehall Place, London, S.W.,
April 19, 1905.

To the President of the Board of Agriculture and Fisheries.

My lord,—We have the honour to submit the following report embodying the principal results of our investigations concerning epizootic abortion as it occurs among bovine animals, and an appendix which gives a detailed account of the experiments and observations on which the report is based:—

HISTORY.

That the knowledge that animals may cast their young before the full period of gestation is ancient may be gathered from the reference to abortion in Genesis c. 31 v. 38, but published information on abortion which may assume epizootic characters is comparatively modern.

Flandrin in 1804 (Nocard and Leclainche) stated that the peasants were so convinced of the contagious nature of abortion that they covered up the foetus carefully and took it out of the byre through a window, so that no cow could afterwards pass over the same route.

In England the 'Complete Farmer' (1807) mentions abortion as contagious, and it has long been looked upon as contagious by many farmers in this and other countries.

In the earlier part of the nineteenth century there were amongst scientists opponents and champions of the theory of contagion. Among the former were Hurtrel d'Arboval (1826) in France and Youatt (1834) in England. Roloff, quoted by Zundel, in 1871 believed that abortion was due to the entrance of an infective agent by way of the vagina, and stated that a discharge from the genitals always preceded the act of abortion. St. Cyr, in 1875, believed abortion to be due to an undetermined but specific agent. Lehnert, in 1878, produced abortion in cows by putting the discharges and foetal membranes from aborting cows into the vagina. This was successfully repeated by Brauer in 1880.

1885 Nocard undertook the investigation of abortion in cows, and in the valuable report published in 1886 he brought forward excellent circumstantial evidence of the contagious nature of the disease. Nocard also submitted the disease to a bacteriological study, without proceeding to the crucial test of attempting to infect pregnant cows with his cultures. The description of the microbes isolated by Nocard (micrococci, isolated, in pairs, or in short chains; and short thick bacilli, isolated or in pairs) does not apply to the microbe isolated at a later date by Professor Bang.

In a report to the Highland and Agricultural Society of Scotland in 1889, Woodhead, Aitken, McFadyean, and Campbell showed that abortion could be produced in cows and ewes by inserting into the vagina plugs of wool contaminated by the discharge of aborting cows. A cow was also made to abort a living fœtus by subcutaneously injecting her with the discharge from an aborting cow.

In 1897 Bang published the results of a very remarkable study of the etiology of epizootic abortion in Denmark. Bang examined the uterus of a cow which had been slaughtered while showing premonitory symptoms of abortion. He found 'between the uterine mucous membrane and fœtal envelopes an abundant odourless exudate —a dirty yellow, somewhat thin, pultaceous material, of a slimy, somewhat lumpy character.' He also found the sub-chorial tissue of the envelopes to be very dropsical In cover-glass preparations made from the exudate and stained with methylene blue he observed a very small bacterium, apparently in pure culture. Many of the organisms lay free, others were in dense clumps which appeared to have been formed inside cells. He described the organism as a bacillus, the body of which contained one, two, and rarely three roundish or elongated granules which readily took up the stain. The bacilli varied in length, the longest being as long as the tubercle bacillus. They were non-motile, and did not stain by Gram's method. These bacilli were also found in the contents of the foetal stomach and in blood from the foetal heart.

Bang concluded from his observations that epizootic abortion ought to be regarded as a specific uterine catarrh determined by a definite species of bacterium. This bacterium was cultivated artificially on a mixture of agar and gelatine, which was first liquefied and then mixed with half its volume of raw serum. Test tubes containing this liquefied mixture of nutrient materials were sown with the uterine exudate and immediately solidified in cold water. In these tubes growths appeared in a form which Bang described as typical of the abortion bacillus. His bacillus could not be cultivated on potato, agar slopes, serum-agar slopes, or the surface of solid serum. It grew very sparingly in glycerine broth, and slightly better in glycerine-broth-serum. In the latter material its growth could be rendered more luxuriant by replacing the air in the flask by oxygen. The peculiar and typical forms of growth described by Bang are particularly referred to and discussed in the Appendix dealing with the biology of the bacillus of abortion; they are mentioned here, however, because at the commencement of our investigation they formed the standard for identification with the bacillus of the Danish disease of any organism which might be isolated from aborting animals in this country.

Bang in his first report also supplied experimental evidence that pregnant cows, mares, and ewes could be infected with pure artificially grown cultures of the bacillus which he had isolated.

In another paper read before the National Veterinary Association in 1906, Bang recapitulated his conclusions regarding epizootic abortion, and reported the results of some attempts to produce artificial immunity in non-pregnant animals, that is to say, before putting them to the male. The method adopted was the usual one of repeated inoculation with pure cultures of the bacillus. The experiments were on too small a scale to allow a conclusion to be arrived at, but the results on the whole were rather encouraging.

METHOD OF OBTAINING MATERIAL.

For the purpose of intimately studying the disease it was necessary to start it, and pass it from animal to animal at the laboratory. Unfortunately, from the farmer's point of view at least, there was no dearth of material, and we were able without going very far afield to purchase animals in which the act of abortion was imminent, from herds in which what we considered to be epizootic abortion had prevailed for some time. A detailed description of the animals purchased and found to be diseased is set forth in Appendix I., A (*see* Cow 12, Cow 13, Cow 14, and Cow 23).

Cow 10 was also purchased for the purpose of bringing material to the laboratory, but she aborted before arrival and was not submitted to post-mortem examination. The foetal membranes from Cow 10, however, were used for experimental purposes, and a description of her case will be found in Appendix I., C, under Experiment 1.

Through the sympathetic co-operation of the Board's Honorary Agricultural Correspondents we were put in touch with a large number of farmers in whose herds the disease prevailed. Many of these gentlemen kindly undertook at the Committee's request to forward material in the shape of aborted foetuses, foetal membranes from aborting cows, and cotton-wool swabs containing the discharges from aborting animals. In order that these materials might arrive at the laboratory in as fresh a state as possible, rubber bags in which to pack the material, and sterilized swabs of cotton-wool on which to collect discharges from the genital organs, were distributed amongst those farmers who had consented to assist us.

During the winter months a large proportion of the material arrived in a reasonably fresh condition, so that except in the summer months there was usually no lack of fresh material from the field with which to vary the stains of experimental virus. When material of this kind from the field was used for experimental infection its description will be found in the Appendix under the experiment for which it was employed. The material thus sent up was also used for other observations which will be described in the parts of the report dealing with the distribution of epizootic abortion in Great Britain (*see also* Appendix I., I).

POST-MORTEM APPEARANCE OF COWS AFFECTED WITH CONTAGIOUS ABORTION.

By consulting Appendix I., A and C, in which the post-mortem descriptions of cows obtained from infected herds in the field and those experimentally infected at the laboratory are given in detail, it will be seen that the appearances in both classes of animals were identical. The method of examination adopted was to open the abdomen of the animal immediately after slaughter, ligature the neck of the uterus, cut the organ out, and take it to the laboratory for minute examination. In no case have lesions that could be connected with abortion been found in any organ other than the uterus. The following description may be accepted as typical of a cow's uterus when affected.

Externally the organ seldom shows any departure from the normal, except that it may sometimes appear slightly more distended than one would expect for the period

of pregnancy. Very exceptionally, however, slight œdema of the uterine wall is present in the neighbourhood of the neck. On cutting into the organ one finds between the chorion and the mucous membrane a variable quantity of exudate. It is particularly abundant around the cotyledons, and it may extend over the whole surface of the uterus and chorion, but apparently the extent of the area covered by it does not altogether depend upon the length of time the animal has been affected, as will be seen by comparing the extent of lesions found in the different experimentally infected animals described in Appendix I., C. The affected area may, in fact, after several months of infection occasionally be so small that there is a risk of its being passed over (*see* Appendix I., H, experiment 63, Heifer 170). Usually, however, the affected area is considerable. In one case of twin pregnancy, with a fœtus in each horn of the uterus, one horn was considerably affected, while the other was to all appearance healthy (*see* Appendix I., A, Cow 12).

The exudate is usually of a light brownish-yellow colour, which is possibly due to the chromogenic character of the microbe (*see* Appendix I., B, Culture on agar, potato, and glycerine-broth-serum (sterilized)). Sometimes, however, it is a dark chocolate colour, due probably in some cases to admixture of blood, and in other cases to the oozing of fluid from the muscles of a mummified fœtus. Its consistence varies from that of fluid pus to that of tough dough. Frequently it is so glutinous that it is difficult to remove small portions with a platinum needle. In the fluid parts one usually finds solid flocculi of varying size. If a portion of fluid exudate be placed in a test tube and allowed to stand for some hours, it separates into a lower portion of yellow solids, and an upper portion consisting of a dirty-gray liquid. When the exudate is removed from the surface of the uterine mucous membrane the latter shows no macroscopical lesions.

In advanced cases many of the cotyledons are softer than normal, and they may even be pulpy. In such cases the cotyledons have a distinctly yellow, necrotic appearance, but no sign of necrosis is to be found on examining sections of the tissue. This appearance has also often been met with in the membranes of aborted calves sent up from the field. The sub-chorial tissue of the fœtal membrane is in some cases œdematous and has an appearance very like mucoid tissue, but this change is not absolutely constant. In quite a number of cases sent up from the field portions of the chorion have been found thickened and of a leathery appearance. This lesion was also met with in one of the experimental cases (*see* Appendix I., C, Experiment 26, Heifer 172).

The fœtus may or may not be altered. Out of 19 fœtuses taken from experimentally infected animals seven were found in which distinct pathological changes had taken place, that is to say, in 36·8 per cent. The changes in the fœtus seem to depend upon the length of time it has been dead. Although several cases have occurred in which the fœtus must have been dead for a considerable time, in no case in the cow was the fœtus putrefying *in utero*. Apparently if the os uteri becomes open at all, the opening is shortly afterwards followed by expulsion of the fœtus. The fœtus may be quite normal in appearance, and up to time as regards development. Sometimes its tissues are œdematous, and occasionally the œdema is blood-tinged. Not infrequently the only alteration found in the fœtus is dropsy of the abdomen, or, it may be, of the chest. The umbilical cord is frequently, though not always, dropsical. Sometimes the fœtus is on the way to become mummified. In such cases the fœtal membranes are closely adherent to it, and when one separates them one removes also what is left of the fœtal skin, exposing a dark brownish-red and distorted mass of bony and muscular tissue in different stages of desiccation. Apparently it does not require a very long time for a dead fœtus *in utero* to become mummified, as in one of the experimental animals a mummified fœtus was found 138 days after infection, that is to say, probably not more than three months after its development had been arrested, assuming that the fœtus died a month after the heifer received the infective material subcutaneously (*see* Appendix I., C, Experiment 13, Heifer 17).

The post-mortem appearances in ewes are, we believe, more of experimental than of practical interest, for, as will be shown in a later report, the disease as it occurs in sheep in the field is quite different from bovine abortion, although pregnant ewes can be experimentally infected with the latter.

The experience of this inquiry has been that, if ewes from one experimental lot were killed in the earlier stages—six weeks or two months—after infection, one often failed to find macroscopic lesions in the uterus, while their fellows, affected at the same time with the same material but left to run their normal course, aborted a month or less before the full term of pregnancy. Indeed, several affected ewes went to full term, when they produced live though weakly lambs, and bacilli of cattle abortion could be found in the membranes (*see* Appendix I., F, Experiments 40 and 42). When present, the lesions found in the ewe do not differ materially from those found in the cow, except that the exudate is more often of a deep chocolate colour, apparently from admixture with blood.

The Microbe of Cattle Abortion.

Morphology.—If a suitably stained preparation made from the uterine exudate of an affected cow be examined under the microscope a large number of white blood corpuscles and catarrhal cells from the uterine mucous membrane can be seen. Between the cells there are numerous small single bacilli, which are mostly of an oval shape; some, however, are distinctly rod-shaped, like the tubercle bacillus, and show one or two unstained areas in their substance. In many places the bacilli are collected into dense groups or colonies. Some of these groups look as if they were bounded by a cell membrane, and give the impression of being contained inside tissue cells. In many cases, however, they look simply like collections of agglutinated bacilli, an appearance which it will be afterwards seen they affect in artificial culture in certain liquid media. Lying amongst the smaller elements of a colony one sometimes sees very large oval elements which take the stain very deeply.

As a rule the majority of the bacilli are between 1 and 2 microns in length, but many are less than 1 micron. The longest measure about 3 microns.

The bacilli are non-motile.

Staining.—They stain admirably with methylene blue or diluted carbol-fuchsin. They do not retain the stain when treated by Gram's method and they are not acid-fast.

Occurrence of the Bacilli in the Fœtus and its Membranes.—In no affected uterus while fresh were abortion bacilli found in the fluids contained inside the fœtal membranes. In the fœtus itself, however, they were frequently, though not always, found in the fluid contents of the stomach. (*See* Appendix I., C, Experiments 1, 3, 7, &c.)

Abortion bacilli were found in the stomach fluid of the fœtus ten times in nineteen experimentally infected cases, that is, in 52 per cent., and it will be seen by consulting Appendix I., I. that this compares in point of frequency more than favourably with the positive results obtained by examining the stomach fluid of fœtuses sent up from the field, in which only 22 out of 51 (43 per cent.) showed abortion bacilli.

In the same 19 experimental cases in cattle the abortion bacillus was never found in the fœtal heart blood, but on one occasion cultures were obtained from the heart blood of a lamb (*see* Appendix I., F, Experiment 44, Ewe 58). On one occasion only was the bacillus found in the peritoneal exudate of the fœtus (*see* Appendix I., Experiment 1, Fœtus 22).

In stained preparations from the mucus present in the fœtal stomach one sees squamous and columnar cells shed from the mucous membrane. Large colonies of the abortion bacillus are seldom met with in this material, but one may see considerable numbers of the single rod elements.

Cultural Characters.—For the purpose of obtaining pure cultures the custom was to thoroughly sear the surface of the intact uterus, open into it with a sterilized knife,

and extract the exudate by means of a sterilized platinum scoop. It is from the exudate that the best cultures are obtained. One can, however, also obtain cultures from the contents of the fœtal stomach. For the collection of the latter material the surface of the fœtal stomach was seared, and its wall pierced by sterilized glass pipettes, into which the fluid was aspirated. Keeping in mind the characters assigned by Professor Bang to the bacillus isolated by him from affected cows in Denmark, we attempted in the first instance to obtain cultures on the artificial media—agar-gelatine + raw serum, and glycerine-broth + raw serum—which he stated to be essential for the cultivation and identification of his organism. According to Bang, when tubes containing agar-gelatine + raw serum are sown with uterine exudate, and incubated, one finds 'at the end of from two to four days a great number of very small colonies, which develop only in a definite zone of the tubes. This zone lies half a centimetre (about $\frac{1}{5}$ inch) under the surface of the nutritive medium, and it has a thickness of from 1 to $1\frac{1}{2}$ centimetres ($\frac{2}{5}$ to $\frac{3}{5}$ inch). Colonies are not present either above or below this.' Professor Bang goes on to say in this connection, 'We had thus not to do with an ærobic bacterium, which would have pushed its growth as far as the surface of the nutritive media, and still less had we to do with an anærobic form, which would have grown as far as the bottom of the tube. The under-limit of the zone of growth lay exactly where the limit of the growth of an anærobic bacillus shows itself (the necrosis bacillus, for example). This highly peculiar behaviour of the abortion bacillus towards oxygen made it at once apparent that we had to do with a distinct species, and therefore rendered it in the highest degree probable that there was a causal connection between the bacterium and the disease.'

'Obviously the peculiar mode of growth which has just been mentioned greatly facilitated our further studies, as we were thereby enabled to recognize the specific bacillus even when it was present in very impure cultures. The colonies are very small, even punctiform, the largest scarcely attaining the size of a pin's head. Their form is roundish, and when slightly magnified their edges seem to be finely dentated.'

When describing later the behaviour of his bacillus in liquid cultures—glycerine-broth-serum (raw)—Bang further stated that the growth could sometimes be rendered more luxuriant by bubbling a large quantity of oxygen through the fluid and afterwards sealing the mouth of the flasks. In speaking of the biological characters of his bacillus, he stated that his observations 'appeared to show beyond any doubt that for the abortion bacillus in its behaviour towards oxygen there are two optima—first, a degree of oxygen tension in the nutritive medium less than that of the atmospheric air; and second, the presence in the nutritive medium of a very high oxygen tension, which, however, lies somewhat under 100 per cent. Between these two optima there is an intermediate zone in which the abortion bacillus grows badly or not at all.' Further, he stated that with the Danish bacillus the growth in glycerine-broth was meagre, and he apparently failed to obtain any growth on the surface of agar or on potato.

We have thought it necessary to quote the above description at length, because the cultural characters of the bacillus were stated to be specific, and to constitute a standard whereby one might recognize the organism of the Danish disease, and because failure to obtain the typical cultures above described when working with the exudate found in the English disease was almost invariable. Further, the bacillus which was isolated and proved to be the cause of cattle abortion in England exhibited many other biological characters different from those described by Bang in connection with the Danish bacillus. Indeed, those differences were so material that, although we were convinced from the start that we had met in the uterine exudate, at least, with the same organism as that described by Bang in Denmark, resort had frequently to be made to experimental tests on pregnant animals in order to prove that the apparently different forms of organism which we had isolated in artificial culture were capable of producing abortion.

Agar-gelatine-serum (raw).—On agar gelatine-serum (raw), it was almost invariably found that the growth began as a gray circular cloud almost immediately below the surface of the medium, or the first appearance of growth consisted of a large number of very small isolated gray specks in the thin film of medium on the surface at the circumference of the tubes. The gray sub-surface cloud very speedily spread to the top, especially if some liquid had been expressed from the medium in the cooling process. Very frequently, too, it was found that the first growth appeared in the expressed surface fluid, if such existed. Distinct macroscopic colonies only appeared in the sub-surface layer of the medium, that is to say, below the grayish ring, after a week or more. Frequently, even when there was no surface fluid present, the growth would extend over the surface of the medium as a thick dirty-white layer. Moreover, it was found that certain microbes which were undoubted impurities would sometimes give a growth very similar to that described by Bang as occurring in this medium. Notably, did it occur to our astonishment that the tubercle bacillus isolated from the uterus of Cow 23 (*see* Appendix I., A) gave a growth absolutely identical with that described by Bang as typical. In fact, from a pictorial point of view it was the most typical growth obtained. Again, it was found that a totally different microbe which was isolated from sheep in the field, and which has been proved to cause abortion in that species, may and frequently does, give a growth almost identical with that described as typical of the Danish bacillus of cattle abortion.

Very occasionally it was found that the growth of the abortion bacillus would begin nearly a quarter of an inch below the surface, that is to say, very nearly in the anærobic layer of the tube. In these exceptional cases the growth would not show until after about ten days' incubation. Never was a growth of colonies throughout the medium obtained except when undoubted contaminations were present, and we think that such an appearance in a tube may be taken as a certain sign of the presence of impurities.

This medium (agar-gelatine-serum) for various reasons was found difficult to manipulate, and as it did not seem to have any specific qualities it was discarded, except for the purpose of special observations (*see* Appendix I., B). It was also discovered later that a solid medium with all the advantages, such as they are, and none of the disadvantages, of the above, could be prepared by adding to the agar-gelatine a similar proportion of serum which had been diluted, alkalinized, and sterilized at a high temperature. Tubes of solid media prepared in this way could be sterilized in the autoclave without the serum undergoing coagulation. In the solidified condition they can be kept in stock, and they can be liquefied when necessary by simply heating the tubes in a Bunsen flame (*see* Appendix I., B, Glycerine-broth-serum sterilized at high temperatures, and agar-gelatine-broth + raw serum).

The individual sub-surface colonies vary in size from a pin's point to the head of a large pin, but, of course, the larger ones develop at a later period. The smaller colonies are grayish in colour, but as they increase in size their centres become of a distinct rusty brown. In outline they are circular, and in many cases the margins are dentated. The most distinct character of the abortion bacillus grown in this way is the appearance of the larger colonies, which have a brownish centre, gray outer part, and dentated edge.

Agar.—On the surface of agar excellent growths of the bacillus were obtained. In order to get such a growth from the uterine exudate one must incubate the tubes for 10 days or more, and for that reason the suitability of this medium was at first overlooked. One can, however, obtain excellent growths on the surface of agar in two or three days by sowing with the culture in the top fluid expressed on the agar-gelatine-serum tubes. After one or two changes from smear to smear these surface cultures grow more luxuriantly. At the first growth appears in the form of tiny dewdrops. If the material used for sowing has been only moderately rich in

organisms, the colonies grow in an isolated manner on different parts of the surface. As they increase in size they develop a faint bottle-green colour, which after a time takes a distinctly yellow, and sometimes a brownish, tint. If the seed material has been rich in organisms a dewy film appears all over the surface. This film also takes on the faint bottle-green tint, and may become yellow or even brown, while a dense grayish deposit of microbes forms in the water of condensation at the bottom of the tubes. At first, as already stated, on account of the apparently great difference between this manner of growth and that of the microbe isolated in the case of the Danish disease, we were inclined to look upon these surface growths as contaminations. That they are cultures of the abortion bacillus cannot be doubted, however, as will be seen later.

Plate Cultures.—Plate cultures can also be obtained on the above solid media contained in flat bottles, such as Soyka's flasks, by liquefying the material, allowing it to cool to between 40° and 45° C., sowing it with exudate or culture, shaking the material through the medium, and then allowing the latter to solidify while the flask is laid flat. For plate cultures, however, plain agar is not so suitable as the agar-serum mixtures. In plate cultures colonies of abortion bacilli appear first throughout the sub-surface layer like brownish-gray specks of bran, and as the colonies increase in size many of them show the reddish-brown centre, gray outer part, and dentated margin. In such flasks there is always a certain amount of condensation fluid. The growth may soon appear in this, and ultimately spread over the surface. Some of the sub-surface colonies extend to the top of the medium, and grow quite luxuriantly on the surface. For obtaining pure cultures of the abortion bacillus from contaminated material the plate method has not been found useful, because the bacillus grows much more slowly than most of the contaminations, and the latter speedily cover the surface of the medium, obscuring the abortion colonies or preventing their growth.

Gelatine.—Gelatine was found useless for the cultivation of the abortion bacillus. It is unsuitable, not only on account of the low temperature at which it has to be incubated in order to preserve solidity, but also apparently from its composition, since the bacillus hardly grows at all even when the gelatine is kept in the fluid state at 37° C.

Potato.—At first it appeared as if potato was useless for the cultivation of the English bacillus, as it had apparently been found to be for the Danish organism. It is not easy to start cultures on potato from the exudate, but it was found to be a most excellent medium for obtaining sub-cultures. No growth, however, is apparent until the tubes have been incubated from seven to ten days, or even longer. The growth begins as a honey-coloured layer, which soon changes to a deep chocolate colour like that seen in cultures of the glanders bacillus. The bacillus of cattle abortion, then, is chromogenic. After a month the layer of growth is very dense.

Glycerine-broth + raw Serum.—This is the medium which was used for the purpose of obtaining liquid cultures of the microbe causing the Danish disease. Cultures of the bacillus which was isolated in connection with the English disease were also obtained in this medium, but it was discarded, except for special observations, because of the difficulty of getting large quantities of serum in a sterile condition for culture purposes, and of the facilities which arise for the contamination of tubes and flasks when raw serum has to be added to them. It was found that if glycerine-broth be mixed in equal proportion with diluted alkalinized serum sterilized at a high temperature (*see* Appendix I., B), one obtains an equally good and much more convenient liquid medium. Further, if one per cent. of grape sugar be added to this medium the abortion bacillus grows much more luxuriantly than in any of the others previously mentioned. Flasks or tubes of this medium may be sterilized in the autoclave, and if sown with abortion bacilli and incubated under ordinary ærobic conditions a very luxuriant growth develops. The method of replacing the air in the flasks by bubbling

filtered commercial oxygen through the liquid for a more or less prolonged period, and then sealing the neck of the culture flasks, does not increase the luxuriance of the cultures. The method, moreover, has many disadvantages. For example, it increases the facilities for contamination, and it renders the flasks liable to burst in the incubator after a period of incubation, because the abortion bacillus in the process of cultivation uses up oxygen, and creates a more or less considerable vacuum inside the flasks. Even if a flask be sown heavily in the ordinary way without replacing the air by oxygen, and the neck be sealed, there is considerable danger of its collapsing inwards owing to the absorption of oxygen by the bacilli from the contained air.

In the liquid serum medium the first growth appears in the form of a gray precipitate. Later on, little yellow and gray flocculi collect at the bottom of the flasks or tubes. The flocculi are more abundant in the raw serum mixtures, especially when sown with exudate.

Peptone-broth.—This is not a good medium for obtaining a first culture from natural material, such as exudate, but a fairly good growth is obtained in peptone broth if it be sown with material from agar slopes. If one per cent of grape sugar be added to the broth the growth is greatly improved, but it is always inferior to that obtained in the glycerine-broth-serum mixtures sown in the same way. In broth made from liver it also grows fairly well.

Milk.—Very good growths of the abortion bacillus were obtained in sterilized milk, but this cannot be considered a useful or convenient medium. Attempts were made, without success, to keep a culture of the abortion bacillus going inside the mammary gland of a milch cow. A pure culture can be injected up the teat of such an animal without causing mammitis, but it was not possible to find abortion bacilli in the milk a week after the injection had been performed.

Physical Requirements.—The abortion bacillus grows best at temperatures between 30° and 37° C. One cannot start a culture outside the incubator, but if actively growing cultures on solid media be incubated for a few days, and then taken out, the growth seems to increase slightly at the temperature of the laboratory.

The bacillus is an ærobe, that is to say, it requires oxygen for its development. It will, however, grow fairly well in a rarefied atmosphere containing very little oxygen, but it will not grow under anærobic conditions. In fact, one can destroy the vitality of an active culture by putting it in the incubator at 37° C. under anærobic conditions for two or three days (*see* Appendix I., B., Physical Requirements).

Microscopical Appearance of Cultures,—The microscopical appearance of cultures varies greatly, according to the medium from which the preparation has been made, and the seed material from which the culture has been obtained. In preparations made from media containing a large proportion of raw serum (one-third) one finds the microbe growing in clumps, no matter what material has been used for sowing, giving an appearance which might be described as that of staphylo-bacilli. The clumping is particularly evident when the medium has been sown directly with uterine exudate. Some of the clumps in the latter case may be seen to contain as many as a hundred elements.

Through the kindness of Professor Bang we have on several occasions received liquid cultures (in raw serum media) of the Danish bacillus from his laboratory for comparison. These always showed small clumped forms, and at first gave the impression that this was the specific form of growth. If preparations be examined from the heated liquid serum media the appearance is the same, provided the culture has been obtained by sowing heavily with natural material. It is otherwise, however, if sub-cultures on heated serum be made from the first culture, or if the flasks be sown from agar smears or other cultures on solid media. In this case one sees nothing but single bacilli, which very much resemble the individual elements of the clumps, but no clumps are present. In hanging-drop preparations no movement is observed. If preparations be made from agar smears or from the top growth on agar-gelatine-

serum (heated), only single elements can be seen, and no clumps are present, although, of course, in such preparations the organisms may be densely packed.

These distinct departures from the characters described as typical for the bacillus of the Danish disease again suggested that possibly a different microbe, and one which was not the cause of abortion at all, had been isolated. It was found, however, that if the raw serum medium was inoculated from an agar slope or other clumpless culture the bacillus grew again in the clumped form. Moreover, if raw serum was added to a clumpless liquid culture in sufficient quantity (about one-third of its bulk), the latter after standing was transformed into a typical clumped culture, and it seemed highly probable that the clumped appearance of the cultures in raw serum was simply due to the natural agglutinating power of the serum. This agglutinating power was, of course, destroyed by the sterilizing temperature, with the result that the organism grew in the unclumped form in the heated serum medium. The exudate, however, also contains agglutinating substances, as may be gathered from the clumped appearance of the organisms in the exudate obtained directly from the uterus, and when heated serum is heavily sown with this material it gives rise to agglutination or clumping of the bacilli.

It was also found that whatever form of culture was used for inoculating agar smears the growth on the latter was always the same as that previously described. Finally it was established by experiment on pregnant animals that the agar smear cultures were those of the abortion bacillus (*see* Appendix I., H, Experiment 63, Heifers 170 and 171).

As previously mentioned, we have been indebted to Professor Bang for kindly sending cultures of the Danish microbe for comparison. From one of those received towards the end of this part of the investigation it was found possible to obtain surface growths on agar and the other apparently atypical growths which had been found to be characteristic of the microbe which was isolated in England. There seems no reason to doubt, then, that the Danish and English diseases are one and the same, and we have not thought it necessary to coin a name for the bacillus, as it seems appropriate that it should be known as 'Bang's Bacillus of Cattle Abortion' in deference to the work of its distinguished discoverer.

Thermal Death-point.—Several observations have been made on the temperature necessary to destroy the vitality of the bacillus of cattle abortion (*see* Appendix I., B, Thermal death-point). It was found that in the moist state it was not destroyed at a temperature of 55° C. maintained for an hour, but two hours at the same temperature proved fatal. If it be kept for ten minutes in water at a temperature between 59° to 61° C. and above, its vitality is destroyed, but after exposure in water at 55 degrees for ten minutes it retains its vitality.

Formation of Toxins.—When the bacteria were removed from an actively growing culture by filtering through a Chamberland filter it was found that one could inject large doses of the filtrate into animals without giving rise to any notable disturbance. (*See* Appendix I., B, Tables I. and II.)

Apparently there is no appreciable formation of soluble toxins in the cultures. When an animal is inoculated, however, with a comparatively large amount of liquid culture or exudate a distinct febrile reaction may follow in a few hours (*see* Experiments 13 and 14, Heifers 17 and 51). Occasionally distressing symptoms of dyspnœa may follow immediately (*see* Experiment 26, Heifer 172). Such symptoms are more likely to arise when an animal is inoculated for the second time after an interval of about ten days. Apparently, then, toxins are developed, but they are of the nature of endotoxins, that is to say, they are contained inside the bodies of the bacilli. Moreover, it would appear that the toxins are not completely destroyed by a high temperature (100° C.), since the inoculation of a sufficient dose of bacilli so heated may cause a febrile reaction in affected animals, and even in normal ones, but to a less extent (*see* Appendix I., I, Diagnosis).

VIRULENT MATERIAL AND ITS VEHICLES.

The contents of the infected uterus, that is to say, the exudate, the foetal membranes, and the foetus, are all virulent, since they contain the microbe. As long as the affected uterus remains closed these materials are inoperative so far as other animals are concerned, but once they have been expelled they become dangerous. The discharge which comes from the genital organs for a varying period after the act is also virulent (consult Experiments 7 and 18, Heifers 5 and 41). It is possible that the dung of an animal which has ingested infective material may be virulent for a time, but it seemed very unlikely that this question could be answered by the results of a few experiments. It is improbable that abortion bacilli are excreted in the milk of affected cows, and some experimental observations which were made show that the bacilli cannot be found in the milk a week after a large amount of culture has been injected up the teat.

The length of time during which the virulent materials may remain infective outside the animal is of considerable importance. By reserving this subject for the later stages of the investigation a good many laborious and costly experiments on animals were rendered unnecessary, because it was found that actively growing cultures could be obtained from exudate which has been stored in fluid for six and seven months, and such cultures were used successfully to infect animals for another purpose (*see* Heifer 49, Experiment 25; Heifer 172, Experiment 26; also Heifer 113, Experiment 27). In the case of Heifer 124 (Experiment 30), exudate from Heifer 17, which had been stored in bulk and kept in a cool room for 365 days, and which was still semi-fluid and non-putrid, failed to infect. The exudate from Heifer 17 was originally virulent, as it infected Ewes 85 and 84 (*see* Experiment 40).

It appears, then, that virulent material may, if kept fluid and free from putrefaction, remain infective for seven months but not for a year. Observations for the purpose of determining more exactly the period between seven months and a year at which it is no longer possible to obtain cultures from exudate stored in fluid are still going on.

We think it is in the highest degree improbable that the microbe propagates outside the animal body; but the advantages from a hygienic point of view derivable from its non-saprophytic characters are largely counterbalanced by the length of time infective material may preserve its virulence outside the animal body.

Desiccation has a destructive influence on the vitality of the virus. The exudate from Heifer 113 (*see* Experiment 27), which was very rich in the bacilli of abortion, was dried in a rarefied atmosphere over chloride of calcium at a temperature of 37° C. for three days. After drying it was finely powdered in a sterile mortar, placed in a sterile test tube, and stored in a dried atmosphere for four months. One gramme of this powder dissolved in broth failed to infect Heifer 130 when administered by the veins (*see* Experiment 31). Under natural conditions, however, exudate takes a long time to dry, for a hard crust forms on the outer layer and protects the inner ones. A small quantity may be quite moist two months in the laboratory.

Once the contents of the uterus have been expelled the virulent material may be carried to other parts of the cowshed along the surface drains. Infective material may be transported long distances in the soiled manure, on the coats of the aborting animals and their companions, and on the hands and boots of attendants. When carelessly disposed of, it may contaminate the water supply. Dogs may carry a portion of an aborted foetus or membranes to other parts of the farm or to neighbouring farms. When an animal has aborted at pasture the virulent material may be taken considerable distances by foxes. It follows also from Experiment 48, Bitch 6, that pregnant bitches and vixen may become infected by eating virulent material, and by afterwards aborting furnish another means of keeping up and spreading virulent material.

Affected in-calf cows may be introduced into a clean herd, and be the means of establishing fresh centres when they abort: this is one of the most insidious ways in which abortion may be spread, for it is impossible for the ordinary individual to say whether a pregnant animal is affected or not.

Cows which have aborted must be considered sources of infection so long as the discharge continues to come from the genital organs, and it may continue intermittently for a few weeks if the animals be not treated. Such animals, if not isolated, may continue to infect the sheds, or the pastures when turned out to graze. Moreover, we understand on good authority that it is a prevalent custom to dispose of cows which have aborted rather than risk breeding from them again. It is to be noted also that cows may discharge a day or two before aborting (*see* Heifers 5 and 7, C). The question whether or not a cow which has aborted and become pregnant again is likely to infect a new establishment, when removed thereto, if bought from a market for example, will be dealt with in the section of this Report relating to methods of infection. The bull as a source of infection will also be discussed under the same section.

METHODS OF INFECTION.

The most certain method of infecting an animal with abortion is to inject natural virulent material or active cultures into the blood stream. By consulting Table VII. (Appendix I., C) it will be seen that this method of infection gave positive results in eight cases, and failed in none. It is not, of course, to be taken as a natural method of infection, but it is of the greatest use experimentally for the purpose of testing cultures and immunity, and for infecting animals for subsequent observations on methods of treatment; in fact, it is particularly useful for all cases in which one wants to make absolutely certain of obtaining infection for experimental purposes.

Animals can also be infected by the subcutaneous inoculation of considerable quantities of virulent material. By consulting Table VI. (Appendix I., C) it will be observed that out of five attempts to experimentally infect animals by this method three were positive, and two were negative. We consider that this method of infection must be looked upon as an artificial one, and we do not think it probable that under natural conditions animals are at all likely to be infected by virulent material gaining access to a wound. As an experimental method of insuring infection it is much inferior to intravenous inoculation.

Coming to the natural methods of infection, there are two ways in which the virulent material may gain access to the pregnant uterus, viz., by the vagina and by the mouth. Table IV. (Appendix I., C) shows that by introducing virulent material *per vaginam* five positive and three negative results were obtained. Table V. shows that by ingestion three positive results were obtained against one negative. We do not think it would be warrantable on this comparatively small number of experiments alone to conclude that infection is more likely to follow when virulent material is swallowed than when it is introduced by the vagina. With regard to infection by the mouth, however, it is a natural method of infection which until recently did not enter into anybody's calculations regarding the spread of abortion, and knowing as we do that the food, including the pastures, and even the feeding trough, may more or less easily be contaminated on an infected establishment, it seems highly probable that infection by ingestion often takes place. In fact, we are inclined to believe that the disease is more frequently contracted in this way than in any other. Presumably, the bacilli are absorbed from the intestine, and gain the blood stream, whereby they reach the uterus. In the case of Ewe 77, the microbe of cattle abortion was found in the cotyledons six days after infection by the mouth (*see* Experiment 42, Appendix I., F).

Infection by the vagina has always been supposed to be the most frequent natural method, partly because it is thought that the gutter which in most cowsheds runs behind cows standing in line often brings the discharges from an aborting cow in contact with the tails and external genital organs of her companions. In considering the relative importance of infection resulting from the more or less accidental admission of infective material from the floor or dirt of the cowshed, it must be borne in mind that, even when discharges from an infected cow do reach the floor or become mixed with the excreta in the channel behind the cows, the chances must usually be against the bacilli gaining entrance to the genital passages, and that the number of bacilli which could be so admitted to the vulva or vagina under ordinary conditions must generally be small. In the experimental attempts to infect with natural virus by way of the vagina (*see* Appendix I., C), three were followed by positive results and three by negative, in spite of the fact that the material was deposited in enormous quantity right on and around the os uteri by means of a long tube.

Infection by the Agency of the Bull.—This must be viewed as a special form of infection *per vaginam,* since it is supposed that the bull, by means of his penis, transfers the bacilli from the vagina of one cow to that of another. There are *a priori* reasons which compel one to admit that such an occurrence is possible, and there is a certain amount of circumstantial evidence to show that in particular cases in actual practice the disease has been spread in that way.

We have scarcely been able to approach this question from the experimental side (*see* Appendix E.), and for the following reasons:—It is obvious that in order to test the ability of a bull to transmit the disease each experiment must be planned so that a diseased cow with her genital passages still infected and a healthy cow shall be served in succession, and with only a short interval, by the same bull. But, owing to the moderate number of diseased and healthy animals at our disposal, we never had available for experiment a recently aborted cow and a healthy heifer which were both in œstrum on the same day. In one experiment of this kind (*see* Appendix E., Heifer 125), an interval of 13 days elapsed between the service of the cow which had aborted and that of the healthy heifer. The result of the experiment was negative, but little importance can be attached to the fact, (1) because the interval between the two services was too long, and (2) because a single experiment with a negative result carries very little weight.

It has to be observed that, with the discovery that infection can readily be brought about by ingestion of virulent material, most of the circumstantial evidence which seemed to establish the bull as a factor of the first importance admits of another and more probable interpretation. For example, it was held that when heifers which had never been in the infected byres aborted at pasture they must have been infected by the bull, but in such cases we are now in a position to say that if recently aborted cows have grazed on the pastures the heifers may have been infected by swallowing grass or water contaminated by the discharge from the genitals of the former, or that virulent material may have been conveyed on artificial food stuffs from the buildings. Without denying that the disease may sometimes be spread by coition, we think that nothing more than a quite subsidiary *rôle* in the spread of epizootic abortion can now be assigned to the bull.

This section of the report would hardly be complete if we omitted to discuss the probability of the persistence of the bacilli in the womb of a cow which has aborted until the date of the next pregnancy. The point will be discussed in another light under the section dealing with natural and acquired immunity, but we may again refer here to Experiments 32, 33 and 34 (E), in which none of the animals which had previously aborted were infected at their next pregnancy, and we may also direct attention to the case of Heifer 173 (Experiment 68, Appendix I., K.), in the uterus of which no abortion bacilli could be found a month after she had aborted. One cannot,

however, pass over the undoubted fact that in practice some cows abort twice, and even three times, in succession; but it does not follow that they do so owing to the persistence of abortion bacilli in their organs. It is at least possible that, not having acquired immunity, and being on infected establishments, as such cases usually are, they have been reinfected.

It is highly improbable that abortion bacilli remain for a long time active in the bodies of non-pregnant animals. The experiments on immunization (Appendix I., J., Heifers 167 and 168) supply a certain amount of experimental evidence against the view that the bacilli remain active in such animals. Heifers 167 and 168 each received 125 c.c. of culture subcutaneously. The former became pregnant 148 days and the latter 106 days afterwards, and one might fairly have expected them both to have become infected from the inoculation had the bacilli remained active in the body.

Symptoms.

If the details of the various experiments recorded in Appendix I., C. be consulted, it will be seen that in the animals which were infected by natural methods, and with what in a sense approaches natural quantities of infective material, no symptoms indicative of disease followed immediately upon infection. It is true that in some of the animals which were infected with considerable doses of virulent material by unnatural channels, such as subcutaneous and intra-venous inoculation, febrile symptoms followed infection, and in one case at least intra-venous inoculation was followed almost immediately by severe toxic symptoms (*see* Experiment 26, Heifer 172), but it may be taken that under natural conditions infection is insidious, and that no noticeable symptoms arise until the animal is about to abort. Even when enormous quantities of exudate or culture are injected into the vagina no local symptoms, such as catarrh or inflammation, follow.

The course of the disease is as a rule slow. In ten experimentally infected animals which aborted, or which were killed when showing unmistakable symptoms of abortion, the average period between infection and the act was 126 days. The shortest period in any of these animals was 33 days, and the longest 230 days. The average period of pregnancy at which abortion took place was 195 days, the earliest 149 days, and the latest 254 days; but it should be pointed out that one can hardly draw any inference applicable to practice from the observations regarding the period of pregnancy, because most of the experimental animals were infected at different stages. There is also good reason to believe that in an animal infected at a late date, and less frequently in one infected in the earlier stages of pregnancy, a premature birth may occur at a period so near the full time that it might not occur to the mind of an ordinary owner that the birth was not normal.

In four of the above mentioned 10 animals no premonitory symptoms of abortion were observed, but, as the act took place in two of the four cases during the night, it is possible that there may have been premonitory symptoms for a few hours. In six out of the 10 cases distinct premonitory signs were noticed for periods extending from a few hours to three days in one case and two days in another. One of the first symptoms observed is that the animal 'makes a bag,' that is to say, the udder swells rather suddenly. In fact, in heifers about to abort in the later stages of pregnancy one may find that the gland has become functional a month or more before its time. The animal becomes uneasy, stamps its feet, and, if in a loose box, moves restlessly about. The vulva is slightly swollen, and the ligaments are somewhat relaxed. At intervals, quantities of mucus, which may be blood-tinged, and later a yellow discharge, come from the vulva. These discharges soil the tail of the animal, and they may even be found on the floor of the stall behind her. In the case of animals aborting in the earlier stages the fœtus may come away completely enclosed in the membranes. In the later stages, however, the membranes may be retained in the whole

or part, and the retained portions are very difficult to remove with the hand. Their presence gives rise to the well known complications following upon retained placenta. After the act of abortion a thin yellowish discharge continues to come from the genital organs for several weeks, and this condition is maintained for even a longer period when the placenta has been retained. It would appear that in cases where the fœtus and its membranes are completely expelled contraction of the uterus may take place in a few hours (*see* Appendix I., C, Experiment 15, Heifer 4).

It is to be noted that one must not always accept slight swelling of the udder, accompanied by restlessness and even a small rise in temperature, about the fifth or sixth month of pregnancy, as evidence that the animal is going to abort, because such symptoms may be observed in perfectly healthy animals.

Distribution and Identity of the Disease.

In the absence of an order requiring the disease to be reported, it is not possible to obtain an exact idea of the extent to which epizootic abortion in cattle prevails throughout Great Britain. We are in a position to state, however, that it is very prevalent. By the co-operation of the Honorary Correspondents of the Board of Agriculture and Fisheries, and many stockowners throughout Great Britain, we have been put in touch with a great deal of valuable material, which has enabled us to establish by examination the existence of epizootic abortion of cattle on 55 farms in 36 counties (*see* Appendix I., I).

We have not in the course of our investigations met with any epizootic abortion in cows which was not due to the bacillus of abortion. We do not deny that odd cases of abortion may rise from accident or poisoning by such substances as lead, but we have no hesitation in stating that we believe that at least 99 per cent of the outbreaks of cattle abortion which assume epizootic characters are due to infection by the bacillus of cattle abortion, and that the fact of a cow having aborted on premises formerly believed to be clean is a sufficient reason for suspecting that the disease has been introduced.

We desire to add to this statement that, if the case be inquired into without delay after an animal has aborted, there will be very little difficulty in arriving at an accurate diagnosis (*see* this Report, Diagnosis, and Appendix I., I.)

Species of Animals which are susceptible.

At the commencement of this investigation it seemed not improbable that epizootic abortion of the different domesticated animals might be one and the same disease. This view appeared to have support when it was found in the laboratory that with the infective material of cattle abortion—uterine exudate and artificial cultures obtained therefrom—pregnant females of most of the other domesticated species could be experimentally infected.

Reference to Appendix I., C and F will show that abortion was experimentally induced by introducing the microbe of cattle abortion into the bodies of cows, ewes, goats, bitches, and guinea pigs. A single experiment on a pregnant sow gave a negative result. This experiment has been repeated, but we have not thought it necessary to delay this part of our report for the further result, and we think it highly improbable that the sow is naturally immune, in view of the susceptibility of other species. As regards the mare, we have done no experiments at the laboratory, but a small number of observations have been made in the field and laboratory which go to show that the equine disease is not caused by the bacillus of cattle abortion. It may be mentioned, however, that Bang has successfully infected many with the latter microbe. Notwithstanding the probability, it would have been rash to conclude definitely that, because the various species of domesticated animals can be infected with the bovine bacillus in the laboratory, that organism is responsible for outbreaks

of abortion among such species in the field. We have not accepted even the bovine bacillus as the cause of epizootic abortion in cattle on the evidence of laboratory experiments alone, but have added to it direct evidence from the field (*see* Appendix I., A and I).

As already mentioned, the field observations make it probable that the bovine bacillus is not responsible for abortion in mares. With regard to sheep, we have never succeeded in finding the bacillus of cattle abortion in the membranes of ewes aborting in the field, although much material has been examined; nor have we ever found it in the uteri of ewes from aborting flocks, even when the animals were killed while showing premonitory symptoms. Further, a totally different microbe—a vibrio —has repeatedly been isolated from outbreaks of abortion in ewes, and has been successfully employed at the laboratory to experimentally infect other ewes which had been tupped at the laboratory and were pregnant for the first time. Pregnant cows, however, cannot be infected with this vibrionic abortion of ewes, and the sheep disease will be the subject of a later report.

We are of opinion that bovine abortion, which is the subject of this first report, is essentially a disease of cattle, and although other species can be experimentally infected in the laboratory they are not likely to contract the disease in practice except as the result of gross carelessness in the disposal of infected material. Although it is hardly germane to the present inquiry, we think it advisable to point out that, since the bacillus of cattle abortion is pathogenic for so many species, the possibility of the human female being infected should not be lost sight of.

Diagnosis.

It is an easy matter to identify the characteristic clumps of abortion bacilli (*see* Appendix I., A and C) in microscopic preparations made from the uterine exudate discharging immediately before and after abortion. The exudate can be collected from an aborting animal on swabs of cotton-wool for transmission to the laboratory (*see* Appendix I., I), or smears can be made on glass slides for examination later. The most reliable material to send away for diagnosis in the laboratory is the fresh fœtal membranes, but the contents of the fœtal stomach may also contain the microbes. The placental cotyledons from a cow affected with epizootic abortion often have a yellow bleached appearance, and the characteristic clumps of bacilli can almost invariably be found and identified with the microscope in material scraped from their surface, even when putrefaction has begun and the material swarms with other microbes (*see* Appendix I., I).

The problem of diagnosis, however, was not completely solved by establishing a reliable method of recognizing epizootic abortion after the act. As already explained, the disease runs a chronic course without symptoms, and although animals are infected a considerable time before aborting they only become infective for other animals during and after the act. The importance, then, of obtaining a method whereby the disease may be diagnosed before the act is obvious. To this end, the agglutinating power of the serum of affected animals as compared with that of healthy ones on cultures of the bacillus was studied, but, although it is not without value in epizootic abortion, the agglutination test cannot be regarded as free from great risk of error (*see* Appendix I., I, Agglutination Test).

'*Abortion*.'—A material analogous to tuberculin was prepared from cultures of the bacillus of cattle abortion. When this substance is injected into the veins or under the skin of an affected animal a temperature reaction generally follows, commencing at the fourth hour after injection and lasting usually until the fourteenth hour. Intravenous injection, however, may also be followed by very alarming systematic symptoms of the nature of anaphylaxia, and characterized by rapid breathing, dyspnœa, the flowing of saliva from the mouth, rigors, and straining. The

intravenous method is not without danger, and would probably be objected to in practice on account of the alarming reaction it may give rise to. The subcutaneous method has not been followed by similarly alarming symptoms, but a larger dose—½ to 1 c.c.—of the crude abortin has to be injected.

The injection of abortin to normal animals may be followed by a temperature reaction, but in the observations so far made on animals whose complete history was known—those of the laboratory—the temperature of normal ones did not rise in any case above 103·6° F., whereas in the affected it rose to 104°-105° and 106° F., and even higher. (Compare Tables XIV and XVI, Appendix I., I). Animals which had aborted reacted to abortion for months afterwards, and a similar reaction was obtainable for a like length of time from animals which had received intravenously a dose of living culture, even if they were not pregnant. Animals which were immunized, and afterwards intravenously inoculated to test their immunity, also gave a reaction, although at the time they were not infected (*see* Appendix I., I, Table XIV., Heifers 167 and 168). One animal which was infected intravenously, and afterwards successfully treated, also reacted (Table XIV., Heifer 187), while one which was infected by the mouth, and was afterwards successfully treated, gave a reaction before treatment, but ceased to react after treatment (Table XIV., Heifer 190). Heifer 172 did not react to the first test, but reacted to a second 63 days later (Table XIV.).

An observation which was made on a portion of an infected herd in the field is of particular interest. The animals of this herd are those designated as 40, 89, 51, 84, 70, 109, and—14, 7, 41, 62, 66, and 87 in Table XV. (Appendix I., I). The first six had aborted at various dates before the test, and they all reacted except 51; the second six were pregnant cows selected haphazard from the others, and of these two reacted and four did not. There has not been time yet to verify the result of the test in the two pregnant reactors, but the great frequency, if not constancy, of the reaction in the tested animals which have aborted, and in those which were known to have been experimentally infected at the laboratory, makes it highly probable that the reaction is a specific one.

The abortin test is now being tried on infected herds in the field, and the results will be reported when they have matured. This will, of course, require some time, as the period of pregnancy in the cow extends over nine months, and it will not be possible to judge of each test until the animal has either aborted or calved normally.

'*Complement Test.*'—The observations which are recorded in the Appendix (I., I) hold out a strong hope that the method of diagnosis based upon what is termed 'fixation of the complement' may prove to be reliable for the diagnosis of epizootic abortion even in its early stages. The actual technique of this method is a little complicated, but the test depends for its success on the fact that the abortion bacilli, although themselves confined to the uterus, manufacture a substance which passes by absorption into the circulating blood, in the serum of which it can be detected by a highly specific character, namely, its affinity for abortion bacilli.

The majority of the observations which have been made have been concerned with the trustworthiness of this method of diagnosis after the act of abortion, and the results indicate that at least for some weeks after the act the method is very reliable. Should this estimate be borne out by further and more extended observations in the conditions of actual practice, the method will prove of great value in those cases in which, owing to the interval which has elapsed since abortion, a direct bacteriological diagnosis can no longer be made.

But, of course, when the blood serum of a cow that has aborted reacts to the test, that is not because of the act of abortion, but because of the state of infection which preceded and determined the abortion; and hence it follows that, although the majority of the observations recorded in the Appendix were made on cows which had actually aborted, the results afford evidence that this method of diagnosis may prove trustworthy for the detection of the disease in apparently healthy pregnant cows in an infected herd.

Natural and Acquired Immunity.

No evidence has been obtained during the investigation to show that natural immunity to the abortion bacillus is possessed by any individuals of the bovine species. It is true that in a number of cases attempts to infect by way of the vagina or mouth or by subcutaneous inoculation failed, but we think the failures can be better explained by attributing them to the methods of introducing the virus rather than to natural immunity, and it is to be noted that not a single negative result had to be recorded when material of established virulence was introduced by way of the blood stream. There would appear, however, to be some grounds for believing that the power of acquiring immunity varies in individuals.

In experiments 54, 55, and 56 (Heifer 5, Heifer 49, and Cow 10, all of which had aborted, Appendix I., G), it was found impossible to re-infect the animals at their next pregnancy. Heifer 5, which had aborted 99 days after infection (*see* Experiment 7, C), became pregnant 216 dyas after aborting. She received, 286 days after abortion, an enormous dose of fresh exudate by the mouth, but did not become infected. Heifer 49 had aborted 33 days after the infection (*see* Experiment 25, Appendix I., C), and became pregnant 326 days after aborting. She received into the juglar vein 10 c.c. of a dense emulsion of uterine exudate 357 days after aborting, and did not become infected. In the case of Cow 10 (*see* Experiment I., C), the date of infection was not known, but she become pregnant two years and 128 days after aborting. She received by the mouth an enormous dose of fresh uterine exudate, and did not become infected. There seems little doubt, then, that these animals had acquired a lasting or active immunity from the previous attack.

From general inquiry (*see also* Table VIII.) we are inclined to believe that a majority at least acquire a serviceable degree of immunity as the result of an attack, but there is no doubt that in practice a considerable proportion abort twice and a small number abort even three times.

One finds it difficult to believe that the absence of subsequent immunity in certain animals which have aborted does not, to some extent, depend on the shortness of the period between infection and abortion. That it is not due entirely to this cause, however, is shown by the case of Heifer 49, as this animal was infected only 33 days before aborting, and resisted infection 357 days afterwards.

Cows which have aborted very often return to the bull two or three times, unless a long interval has elapsed since abortion took place. It is believed by many farmers that each failure to hold to the bull really means that the cow has aborted a very young fœtus. This opinion, however, is based merely on surmise, and no evidence in support of it has been obtained by carefully watching the animals which aborted at the laboratory and were afterwards put to the bull. It seems to us that one might with almost as much reason say that, in every case in which an animal which has not previously aborted does not hold to a service, a very young fætus has been aborted. It may also be pointed out that the prevalent belief from observation is that, when a cow does become infected a second time, the calf is carried for a longer period than in the first instance. The most likely explanation of the failures to pregnant seems to be that the uterine mucous membrane has not completely regenerated itself after the attack.

Immunization.

From the first it appeared that the disease was not one against which a protective serum could be successfully used. The protection derivable even from a potent serum cannot be depended upon to last more than two or three weeks. The period of risk extends over at least 7½ months of pregnancy in cows, and it would neither be practicable nor economically possible to give the ordinary cow a protective dose of a rather expensive serum every fortnight throughout that period, even were a potent serum obtainable. Moreover, as curative agents in advanced stages of disease, sera, as a rule, have little or no value.

It was found that enormous quantities of pure virus or culture could be injected into non-pregnant animals without serious consequences, and since a 'serum alone' method seemed without promise, and there was no necessity to use a serum to modify the action of the virus, the idea of hyper-immunizing animals for the production of serum was abandoned. The most hopeful line of inquiry seemed to be the production of immunity by inoculation of large doses of pure culture. One of the great objections to the protective inoculation methods in practice is the number of operations necessary to ensure protection. But, owing to the harmlessness of large quantities of pure cultures of the abortion bacillus when injected into non-pregnant animals, it seemed possible that whatever degree of immunity could be established by a practicable number of small doses might be conveyed by inoculating one large dose.

It was necessary, of course, that the immunizing dose should be inoculated some time before the animals were put to the male, in order to give their bodies time to rid themselves of the abortion bacilli before pregnancy began, as otherwise the effect would have been to infect the pregnant uterus. The period aimed at for putting the animals to the male after inoculation was from six weeks to two months, but, of course, it could not be timed exactly.

In the first instance sheep were used on account of their small cost in comparison with that of cattle.

The results of these experiments on sheep (Experiments 64 and 65, Appendix I., J) are epitomized in the following table.

Animal.	Method of immunization.	Days after immunization when Pregnancy began.	Days after immunization when tested.	Days after taking Ram when tested.	Material used, and Method of Test.	Results.
Ewe 63...	100 c.c. of culture subcutaneously.	68	119	50	10 c.c. of stomach fluid of Fœtus 45 (H. 51) subcutaneously.	Gave birth to dead lamb at full time. No abortion bacilli found in membranes or fœtus.
Ewe 64...	" .	75	119	43	25 c.c. of above stomach fluid by the mouth.	Began to abort a mummified fœtus 157 days after being tupped. Abortion bacilli found in discharge.
Ewe 69...	200 c.c. of above culture subcutaneously.	69	81	12	" .	Gave birth to a live lamb ten days before time. No abortion bacilli found.
Ewe 70...	" .	61	81	20	10 c.c. of above fluid subcutaneously.	Aborted a dead lamb ten days before time, and 114 days after infection. Abortion bacilli found.
Ewe 65...	10 c.c. of above culture subcutaneously.	68	81	13	" .	Never produced anything. Believed to be barren.
Ewe 66...	" .	67	81	14	25 c.c. of above fluid by the mouth.	Began to lamb seven days over full time, and 150 days after infection. The discharges contained abortion bacilli, and the lamb was dead.
Ewe 67...	" .	61	81	20	" .	Ten days before full time and 150 days after infection gave birth to a living lamb. No abortion bacilli found.
Ewe 68..	" .	Did not take ram.	.....	.....	....	Died of cirrhosis of the liver.
Ewe 105*a* Control.	....	.....	.....	6	5 c.c. of above fluid into jugular vein.	Gave birth to a living lamb at full time, but the lamb only lived 12 hours. No abortion bacilli found.

It will be seen that of the six protected ewes which became pregnant, one aborted at 81 days and gave evidence of being infected; one aborted a dead lamb ten days

before time and gave evidence of being infected; one gave birth to a dead lamb seven days over time and gave evidenc of bing infected; one gave birth t oa dead lamb at full time and gave no evidence of being infected; and two gave birth to living lambs ten days before time and gave no evidence of being infected; the control (unprotected) ewe brought forth a living lamb at full time without giving evidence of being infected, but the lamb died twelve hours after birth.

It will be observed that the disappointing results recorded above cannot be correlated with either a large or a small protecting dose of culture, or with the method by which the infecting virus was administered. Moreover, if these irregular results be compared with those contained in sheep which had not been subjected to any immunizing procees (*see* Appendix I., F) they will be found to correspond as regards irregularity.

It is possible that sheep are not in a high degree immunizable against the bacillus of cattle abortion; but, apart from this hypothesis, the very irregular results which follow infection in normal ewes, and the fact that in spite of being infected they may carry their lambs to full time, led to the opinion that no results of any great practical value would be derived from continuing these experiments on ewes.

The results with heifers were much more encouraging (*see* Experiment 66. Heifers 167 and 168, Appendix I., J).

Two heifers each received subcutaneously 125 c.c. of a rich liquid culture of the baecillus of cattle abortion. Heifer 167 became pregnant 148 days after immunization. Her immunity was tested by inoculating intravenously 10 c.c. of a dense emulsion of virulent uterine exudate 188 days after immunization and 40 days after becoming pregnant. She was killed and found free from infection 112 days after the test inoculation.

Heifer 168 became pregnant 106 days after immunization. Her immunity was tested by giving her enormous doses of virulent exudate both by the mouth and vagina 36 days after becoming pregnant and 142 days after immunization, and 16 days later she received 10 c.c. of a dense emulsion of virulent exudate into the jugular vein. She was killed and found free from infection 122 days after receiving the first infecting dose.

These results with heifers are all the more encouraging when one remembers that not a single negative result followed the intravenous inoculation of unprotected heifers with uterine exudate (*see* Table VII., Appendix I.), and it should be noted also that the tests applied were in point of severity far beyond anything likely to be met in practice.

It was quite beyond the scope of an inquiry such as this to attempt to experiment on say 100 animals at the laboratory, nor would it have been possible to simulate the less severe conditions of infection obtaining in the field without converting the experimental station into an infected farm. Seeing, however, that the immunization process is harmless to non-pregnant animals, it shold not be difficult to induce plenty of owners of infected herds to try protective inoculation under the supervision of the Board, and in this way obtain an idea of its value as a practical measure in fighting epizootic abortion. The most useful way of employing preventive inoculation would be to inoculate all non-pregnant heifers and cows in an infected establishment six weeks or two months before putting them to the bull, and the method might also be used in the same way to further develop the resistance of animals which have aborted, and which are still non-pregnant. It is possible, of course, that the protection, which in the above heifers certainly lasted at least 188 days in one case and 142 days in the other, may not in practice extend over the period of risk (7½ months). On the other hand, we would point out that in Experiments 54, 55, and 56 (Appendix I., G) the immunity acquired by Heifer 5 lasted at least 286 days, that Heifer 49 was immune for 357 days, and that Cow 10 retained her immunity for 2 years and 151 days. It would appear, then, that immunity once acquired may be of long duration.

Field operations are already in progress on the treatment of infected herds. There are decided indications that there will be no lack of volunteers anxious to put their infected herds at the disposal of the committee, and a large amount of material is being prepared for observations in the field. These field observations, however, cannot be expected to mature for a year or more, when, it is possible, they may provide material for a special report.

Curative Measures.

On account of a somewhat prevalent idea that carbolic acid given internally will cure animals affected with abortion, or prevent the infection of healthy pregnant animals, it was considered advisable to put this alleged remedy to an experimental test. Heifer 188 (see Experiment 67, Appendix I., K) was infected with virulent material 43 days after becoming pregnant, and 30 days after infection she received every other day two drachms of carbolic acid in a mash by the mouth, alternated every fortnight by subcutaneous injections of one drachm in glycerine and water given every other day. This treatment was continued for 10 weeks. She aborted 102 days after infection and in the tenth week of treatment; abortion bacilli were found in the discharges.

From the first it seemed most unlikely that carbolic acid or any other disinfectant administered even in a poisonous dose would be absorbed and reach the uterus in a sufficiently concentrated form to have any action on its bacterial contents. There are many farmers who have had no success whatever in the field with the carbolic acid treatment for abortion, and the evidence on which the alleged successes are based will hardly stand analysis. In the first place, the animals put under the treatment in practice are not known to be infected, and yet every one which does not abort is regarded as cured by the advocates of the method. In the second place, the treatment is usually adopted towards the end of an outbreak, that is to say, at a time when abortion is practically confined to a proportion of the animals recently brought into the herd; and the reduction in the number of cases is attributed to the alleged remedy, whereas it is more open to a totally different explanation, viz., that after the third year the disease practically confines itself to some of the new animals brought in, with the result that since these form only a small proportion of the whole the opportunities for infection are greatly diminished.

The usual history of an outbreak of abortion is that for the first two or even three years it claims many victims in the original herd, and after this one gets only a few odd cases a year, unless many new animals have been introduced.

Heifer 188 may be said to have been vigorously treated with carbolic acid, but the treatment completely failed, and on account of the slender foundation upon which the carbolic treatment rests we did not feel justified in pursuing this experiment further.

Experiments were also undertaken to see whether actually infected animals could be successfully treated by subcutaneous injections of bacilli killed at 55° C. (*see* Appendix I., K, Experiments 68, 69, 70, and 71, Heifers 173, 189, 187, and 190). With the exception of Heifer 190, they were all infected by intravenous inoculation, exudate being used.

Heifer 173 was treated every week for ten weeks, starting a fortnight after infection. Treatment was begun with doses of 30 c.c. of dead liquid culture.* The doses were fairly rapidly increased to 200 c.c. as soon as it was found that the dead bacilli injected subcutaneously produced no alarming effect. In all she received 1,350 c.c., but she nevertheless aborted about the average time after infection (123 days).

Heifer 189 did not abort, but her case cannot be fairly considered, as she was only 17 days infected and had been only once treated when she calved.

* This dose represents the amount of original liquid, but in reality the animals received cultures evaporated to a small bulk.

Heifer 187 was put under treatment 28 days after infection and received fortnightly doses, starting with 100 c.c. and going immediately to 200 c.c. She received in all 700 c.c. She was killed 112 days after infection, and found healthy.

Heifer 190 was infected by the mouth, and treatment was commenced 51 days after infection. She received monthly doses of 400 c.c. for three months, amounting in all to 1,200 c.c., but it is probable that the last dose given eight days before slaughter was unnecessary. She was killed 113 days after infection, and although pregnant was found to be absolutely healthy.

It would appear that treatment with dead bacilli failed in one case (Heifer 173), but succeeded in two other cases (Heifer 187 and Heifer 190). The treatment of Heifer 173 was begun under more favourable conditions, since the animal was only fourteen days infected at the start. The initial doses, however, were, comparatively speaking, small, although the total amount of material was enormous. The treatment in the cases of Heifers 187 and 190 was begun much later—at the 28th and 51st day, respectively, after infection, but the initial doses administered were much larger. One cannot hope to settle the value of this treatment in the laboratory, but, since it is harmless, there should be no difficulty in getting owners of infected herds to try it. Infected herds have already been put at our disposal, and the suspected animals will be treated with large doses of dead bacilli. It is hoped the results along with those of immunization will provide enough material for a future report.

The plan of the field observations on treatment is to try to pick out the infected animals by one of the methods mentioned under 'Diagnosis,' isolate them, and treat them with large doses of dead cultures.

PREVENTION AND ERADICATION.

The methods which have been relied upon in the past for the prevention of abortion and its eradication from a herd are:—

(1) Periodical spraying of the external genital organs and hind quarters with disinfectant solutions.
(2) Isolation of animals as soon as they show the premonitory signs of abortion.
(3) Internal administration of carbolic acid to animals supposed to be infected or exposed to infection.
(4) Irrigation of the genital passages of animals which have aborted with antiseptic solutions.
(5) Removal and disposal of animals which have aborted.
(6) The keeping of a special bull for serving animals which have aborted, or, what is based on the same idea, the disinfection of the external genital organs of the bull with antiseptic solutions after he has served such a cow.
(7) Destruction of the abortion membranes, and disinfection of the parts of the buildings, litter, &c. with which the infective material has come in contact.
(8) The keeping of a goat, especially a male goat, in a byre with the cows.

It cannot be said of the above measures that either singly or collectively they have brought about any material improvement in the general condition of our herds in relation to abortion. According to reports, decided improvements have been effected in individual herds by the adoption of isolation and disinfection, while in others very little has been accomplished. Some of the above methods are founded on nothing more than ignorant empiricism, while others are based on pathological and physiological considerations which are only partially correct in their applications. Since most of them have obtained a certain amount of hold, at least on the minds of stockowners, it may be useful to discuss each measure separately in the light of our recent investigations.

Spraying of the External Genital Organs.—This is done on the assumption that virulent material may at intervals come in contact with the external genital organs, and that if the latter be sprayed with disinfectants the virus will be destroyed. In the section dealing with methods of infection we have pointed out that it is highly improbable that infection can take place through the agency of virulent material which has been merely deposited on or about the external genital organs. Apart from this, however, to be effectual, any bactericidal agent would require to be applied to the material almost at the moment when it comes in contact with the genital organs—an impossible thing to accomplish by periodical spraying, or by any other method which is practicable. We think, therefore, that this method is useless so long as the animals remain in an infected byre, and that it may be discarded. Immediately before removing an animal from infected to clean premises, however, we think it would be advisable to thoroughly wash the posterior portions of its body with a disinfectant solution, such as corrosive sublimate, 1 in 2,000, or carbolic acid, 3 per cent.

Isolation of Animals as soon as they show Signs of Abortion.—The necessity for this measure is obvious, and its importance cannot be too much insisted on. In the section on 'the virulent materials' it was explained that an infected animal only becomes infective to others immediately before the act of abortion, and may remain so for some weeks afterwards. Under the heading of 'Symptoms,' however, it was stated that only a proportion of the affected animals showed premonitory symptoms, and that quite a number may abort amongst their companions without warning. Under such conditions, then, measures of immediate isolation lose much of their undoubted theoretical value, owing to the difficulty in the way of carrying them out in practice. There is not likely to be any serious difficulty in diagnosing the bacterial disease after the act of abortion, even in an isolated case, if the membranes are available in a reasonably fresh state. Should the 'fixation of the complement' and 'abortion' tests (*see* section on Diagnosis), justify in actual practice the hopes raised by their application in the laboratory, they will not only constitute additional means of establishing the diagnosis after the act, but will furnish a method of diagnosing the disease a considerable time before the uterus has ejected its virulent contents, and so give to measures of isolation their full and undoubted value in practice.

Isolation of the affected animals, however, must be complete before and after the act to be of any real value. Having regard to what appears to be the most common form of infection, viz., by ingestion, we do not think that anything material is to be gained by merely putting all the cows about to abort and those which have aborted at the lower end of a byre, so that the infective discharges may not come in contact with the external genital organs of their fellows, unless we assume that infection frequently takes place by an animal licking virulent material from a part of its body where it has been deposited by flicks of the tail which has been contaminated by lying in the gutter behind the stalls.

Internal Administration of Carbolic Acid.—The uselessness of carbolic acid and other antiseptics as curative agents has already been referred to. As a preventive agent by internal administration we believe carbolic acid to be equally useless. Even if it were possible to administer very large doses of this poisonous substance, one could not expect to be able to give enough to destroy the bacilli which have been swallowed and mixed with the contents of the enormous stomachs and intestines, and it would be equally hopeless to expect to destroy in this way the bacilli which have already reached the womb. This alleged measure of prevention must be regarded as an absurdity which has gained a certain amount of support owing to observations carelessly collated and carelessly interpreted.

Irrigation of the Genital Passages after Abortion.—With the act of abortion the greater part of the uterine exudate is immediately ejected. That some of it remains

behind for a short period is certain, since we were able to demonstrate abortion bacilli in material obtained from the vagina of a heifer three days after she had aborted (*see* Appendix I., C, Experiment 18, Heifer 41). On the other hand, no abortion bacilli could be found in the uterus of Heifer 173 (Experiment 68) a month after she had aborted. It seems probable that, as a rule, the genital organs cleanse themselves by natural means a comparatively short time after abortion has taken place (*see also* 'Methods of Infection'). Almost immediately after abortion and expulsion of the membranes the uterus contracts, and its internal surfaces come into apposition. Its condition is such that it would not be possible to force fluid into it with a pump from the vagina. Apart then, from the probability that disinfection of the uterus by antiseptics is not necessary to rid the organ of abortion bacilli, we are of opinion that it is futile to attempt it by irrigation methods. So long as a discharge continues to come from the genital passages, we think that for hygienic and therapeutic reasons they ought to be cleansed once or twice daily by the intra-vaginal injection of tepid antiseptic solutions, such as a 2 per cent solution of carbolic acid or a 1 in 3,000 the uterus. We are of opinion that it will seldom be necessary to continue the injections for more than a month, and that after three months there should be small risk in putting the cow to the bull, provided she is afterwards protected against fresh infection. In this connection we would again draw attention to the experiments in Appendix I., E and G, in which cows which had previously aborted did not become infected at their next pregnancy whether their genital passages were irrigated after abortion or not.

Removal and disposal of Animals which have aborted.—It is quite a prevalent custom to feed for the butcher cows which have aborted. It is also customary to sell such cows alive in the open market. The second custom we consider likely to introduce disease to other establishments, unless the animals have ceased to discharge; they should, we think, be kept for at least three months after abortion before being sent for sale.

The first custom is less objectionable than the second, but we think that a breeder will be more likely to get rid of abortion from his herds by keeping such animals than by disposing of them and bringing in new ones before his entire herd is free from the disease. There can be no doubt that in most cases an attack of the disease greatly increases an animal's resistance to future attacks, and that in a large proportion of the affected, probably in the majority, this resistance is sufficient to fortify them against infection during their next pregnancy. It is beyond doubt that a considerable proportion may abort twice in succession, but it is not improbable that inoculation methods may now be successfully employed to exalt their resistance. In the midst of infection there is no better guarantee against the disease than the possession of an immune stock, and for this reason we consider that on infected premises the animals which have already aborted are to be looked upon as valuable assets for purposes of eradication, much more valuable than the new and susceptible animals brought in. We find, however, that a small proportion of cows will not hold to the bull for an indefinite period after abortion, and it may be found better to fatten off such animals, unless they are of high value.

The keeping of a Special Bull for Cows which have aborted.—We have already stated that we do not consider the bull a factor of the first importance in the dissemination of abortion, but that infection by means of a contaminated bull must be looked upon as a distinct possibility. We think, therefore, that there is something to be said in favour of keeping a bull for the service of cows which have aborted, and, when that is not possible, of disinfecting the external genital organs of the bull after he has served such cows. Of course, if the cows can be immunized the same bull might be used for all. We do not think that cows from a clean establishment should be sent even to a clean bull on infected premises, and it is also inadvisable that cows from infected premises should be sent to a bull on a clean establishment.

Destruction of Virulent Material and disinfection of everything contaminated by it.—The immediate disinfection of the virulent materials and contaminated objects is of great importance, more especially as it appears that the natural virus may remain active for a long time outside the body. The soiled litter, dung, exudate, membranes, and fœtus should all be removed at once, preferably after they have been treated with caustic lime. After removal they shold be soaked in paraffin and burned, or buried in a deep pit, preferably the former. On no account should the fœtus and membranes be fed to pigs or dogs. When a fœtus is aborted alive, as sometimes happens, it seldom survives long, and it is advisable to kill and destroy it, since it may excrete abundance of virulent material from its intestines if allowed to live. If, however, it be decided not to kill it, it should immediately be isolated. The walls of the stall and the floor should be washed or strewn thickly with caustic lime, or drenched freely with boiling water. The temperature necessary to kill the bacillus is not great, and this simple method of disinfection should prove efficacious. Lastly, the boots, clothing, and hands of attendants should be disinfected by making use of any reliable disinfectant, such as a 3 or 4 per cent solution of carbolic acid.

The keeping of a Goat amongst the Cows.—This, we believe, can only have its origin in ignorant superstition, but we feel bound to mention it, as the question of its efficacy has quite frequently been seriously put to us. We would point out that goats themselves can be infected with cattle abortion, and that both male and female goats were on our premises during the greater part of the time occupied with the cattle experiments, and their presence did not prevent animals from aborting.

Preventive Inoculation.—At this stage of the inquiry we think we are justified in provisionally adding preventive inoculation to the prophylactic measures previously discussed.

In the section of this Report dealing with immunization (*see also* Appendix I., J) we cited experimental evidence to show that the bovine female can be rendered highly resistant to infection with virulent material by the subcutaneous injection of a comparatively large quantity of active liquid culture of the abortion bacillus, and it was also explained that the inoculation must be performed about two months before the commencement of pregnancy. A considerable number of observations on the value of this method of preventive inoculation are now being conducted on infected herds in different parts of the country, but, as will be well understood the value of the method cannot be estimated until a relatively large number of the inoculated animals exposed to natural infection either abort or give birth to calves at full term. Should the results under the conditions of actual practice bear out those already obtained in the laboratory, stockowners will be in possession of a preventive method which is perhaps the most valuable of all methods for dealing with a disease of the nature of epizootic abortion. Of course, one would only employ such a method in herds in which infection already exists, and the best way to make use of it will be, assuming that the results in practice bear out those obtained at the laboratory, to inoculate all new animals coming in, and those already in the herd which have calved normally, about two months before they are put to the bull. Since one cannot be certain that every animal which has aborted will have acquired immunity, it will be advisable also to inoculate the latter to exalt whatever degree of resistance they have acquired from the natural attack, but, as already mentioned, the animals which have aborted should not be put to the bull for a period of three months.

For reasons already explained it is not possible to immunize pregnant animals with living cultures. It is possible, however, that a not inconsiderable degree of immunity of shorter duration may with safety be bestowed on pregnant animals by inoculating them with a large dose of bacilli which have been killed at a low temperature. This, however, will be dealt with in a later Report.

LEGISLATIVE MEASURES OF PREVENTION.

We refrain at this stage from making any recommendations regarding measures which might usefully be taken by the Board for the prevention of epizootic abortion, as these will be dealt with in a special Report after representative agricultural witnesses have been examined.

EDWARD STRACHEY.
JOHN GILLESPIE.
J. McFADYEAN.
WILLIAM HUNTING.
GEO. H. F. NUTTALL.
STEWART STOCKMAN.

APPENDIX No. 15.

THE ANIMAL CONTAGIOUS DISEASES ACT AND THE REGULATIONS MADE THEREUNDER RELATING TO QUARANTINE AND THE CONTROL OF DISEASE.

Chapter 75.—An Act respecting Infectious or contagious Diseases affecting Animals.

(As Amended.)

SHORT TITLE.

1. This Act may be cited as the Animal Contagious Diseases Act. 3 E. VII., c. 11, s. 1. Short title

INTERPRETATION.

2. In this Act, unless the context otherwise requires,— Definitions.

(*a*) 'the Minister' means the Minister of Agriculture;

(*b*) 'foreign animals' means animals not already introduced into Canadian territory, outside of quarantine stations;

(*c*) 'contagious' means communicable by close contact or inoculation;

(*d*) 'infectious' means communicable in any manner;

(*e*) 'infectious or contagious disease' includes, in addition to other diseases generally so designated, glanders, farcy, *maladie du coït,* pleuro-pneumonia contagiosa, foot and mouth disease, rinderpest, anthrax, Texas fever, hog cholera, swine plague, mange, scab, rabies, tuberculosis, actinomycosis, and variola ovina. 3 E. VII., c. 11, s. 2; 4 E. VII., c. 6, s. 1.

DUTIES OF OWNERS OF ANIMALS.

3. Every owner of animals and every breeder of or dealer in animals, and every one bringing animals into Canada, shall, on perceiving the appearance of infectious or contagious disease among the animals owned by him or under his special care, give immediate notice to the Minister and to the nearest veterinary inspector of the Department of Agriculture of the facts discovered by him as aforesaid. Notice of disease to be given.

2. Any veterinary surgeon practising in Canada shall, immediately on ascertaining that an animal is labouring under an infectious or contagious disease, give similar notice to the Minister and to the nearest veterinary inspector. 3 E. VII., c. 11, s. 3.

Penalty for neglect.

4. Every owner of such diseased animals who neglects to comply with the provisions of the last preceding section shall forfeit his claim to compensation for any animals slaughtered in accordance with the provisions of this Act; and no such compensation shall be granted to him. 3 E. VII., c. 11, s. 4.

SLAUGHTERING DISEASED CATTLE.

Slaughtering diseased animals.

5. The Minister may, from time to time, cause to be slaughtered animals suffering from infectious or contagious disease or suspected of being so affected, and animals which are or have been in contact with or close proximity to a diseased animal, or an animal suspected of being affected by infectious or contagious disease. 3 E. VII., c. 11, s. 11.

Compensation to owners.

6. The Governor in Council may order a compensation to be paid to the owners of animals slaughtered under the provisions of this Act; and in all cases the value of the animal for which compensation is ordered, shall be determined by the Minister or by some person appointed by him, but, except as hereinafter provided, such value shall not exceed, in the case of grade animals, one hundred and fifty dollars for each horse, sixty dollars for each head of cattle, and fifteen dollars for each pig or sheep, and, in the case of pure bred animals, three hundred dollars for each horse, one hundred and fifty dollars for each head of cattle, and fifty dollars for each pig or sheep.

May be withheld

2. Such compensation may be withheld in whole or in part whenever the owner or the person having charge of the animal has, in the opinion of the Minister, been guilty in relation to the animal of an offence against this Act, or whenever the animal being a foreign one was in his judgment diseased at the time of entering Canada. 3 E. VII., c. 11, s. 12.

Basis of compensation.

7. The compensation, if any, shall be two-thirds of the value of the slaughtered animal, determined as aforesaid, before it became affected with infectious or contagious disease, or came in contact with or in dangerous proximity to animals so affected. Provided that,—

(*a*) when it is clearly shown that an animal has been slaughtered on insufficient grounds and that the slaughter was not in accordance with or justifiable under this Act, the owner shall be entitled to compensation at the full value of the animal so slaughtered; and,

(*b*) if in any case, the sum received by the Government on the sale of a carcass of an animal slaughtered exceeds the amount paid for compensation to the owner of the animal, the excess after deduction of reasonable expenses shall be paid to the owner. 3 E. VII., c. 11, s. 12; 4 E. VII., c. 6, ss. 2 and 3.

Experimental treatment and *Post mortem* examination.

8. The Minister may, notwithstanding anything in this Act, reserve for experimental treatment any animal ordered to be slaughtered under this Act, and may authorize any of his officers or persons employed by him to make *post mortem* examinations of animals which have died, or are supposed to have died, from infec-

tious or contagious disease, and to dig up carcases of such animals for the purpose of investigation. 3 E. VII., c. 11, s. 13.

PROHIBITION OF IMPORTATION.

Governor in Council may prohibit importation.

9. The Minister may, from time to time, prohibit the importation or the introduction into Canada, or any part thereof, or into any particular ports thereof, of animals, or of flesh, hides, hoofs, horns or other parts of animals, or of hay, straw, fodder or other articles, either generally or from any places named in the order, for such period as he deems to be necessary for the purpose of preventing the introduction of any contagious or infectious disease among animals into Canada. 3 E. VII., c. 11, s. 14.

OFFICERS AND THEIR DUTIES.

Appointment of officers.

10. The Minister may appoint inspectors and other officers when he deems it necessary, but such appointments shall be confirmed by the Governor in Council within thirty days of the date thereof. 3 E. VII., c. 11, s. 16.

Duties of officers.

11. Inspectors or other officers appointed as aforesaid, on receiving information of the supposed existence of any infectious or contagious disease among animals, shall proceed to the place mentioned with all practicable speed, and execute and discharge their duties pursuant to the regulations made under the authority of this Act and the instructions received by them. 3 E. VII., c. 11, s. 17.

Inspector's power of entry.

12. Any inspector or other officer appointed as aforesaid may, at any time, for the purpose of carrying into effect any of the provisions of this Act, enter any place or premises, or any steamship, vessel or boat, or any carriage, car, truck, horse-box or other vehicle used for the carriage of animals, but shall, if required, state in writing the grounds on which he has so entered. 3 E. VII., c. 11, s. 36.

Seizure of animals.

13. If any animal infected with or labouring under any infectious or contagious disease, or suspected of being so affected is sold, disposed of, or put off, or is exposed or offered for sale in any place, or is brought or attempted to be brought for the purpose of being exposed or offered for sale in any market, fair or other open or public place where other animals are commonly exposed for sale, any clerk or inspector, or other officer of the fair or market, or any constable or policeman, or any other person authorized by the mayor or reeve, or by any justice of the peace having jurisdiction in the place, or any person authorized or appointed by the Minister, may seize the animal and report the seizure to the mayor or reeve, or to any justice of the peace having jurisdiction in the place; and such mayor, reeve or justice, or person authorized or appointed by the Minister, may, after veterinary examination and verification, cause the animal, together with any pens, hurdles, troughs, litter, hay, straw, or other articles which he judges likely to have been

infected thereby, to be forthwith destroyed, or otherwise disposed of, in such manner as he deems proper, or as is directed, as provided by this Act. 3 E. VII., c. 11, s. 10.

Apprehension of persons.

14. Any inspector or constable may, without warrant, apprehend any person found committing an offence against the provisions of this Act with respect to infected places, and shall take any person so apprehended forthwith before a justice of the peace to be examined and dealt with according to law; and a person so apprehended shall not be detained in custody without the order of a justice longer than twenty-four hours; and any inspector or constable may require that any animal or thing moved out of an infected place in violation of the provisions of this Act be forthwith taken back within the limits of that place, and may enforce and execute such requisition at the expense of the owner of such animal or thing. 3 E. VII., c. 11, s. 43.

INFECTED PLACES.

Notice to owners.

15. Whenever an inspector finds or suspects infectious or contagious disease of animals to exist, he shall forthwith make a declaration thereof under his hand and shall deliver a copy of such declaration to the occupier of the common, field, stable, cowshed or other premises where the disease is found; and thereupon the same, with all lands and buildings contiguous thereto in the same occupation, shall be deemed to be an infected place; and the same shall be held to be an infected place until the determination and declaration of the Minister relative thereto in this Act provided for. 3 E. VII., c. 11, s. 18.

Report to Minister.

16. Whenever an inspector makes such a declaration of the existence or suspected existence of infectious or contagious disease of animals, he shall, with all practicable speed, send a copy thereof to the Minister; and if it appears that infectious or contagious disease exists, the Minister may so determine and declare, and may prescribe the limits of the infected place; but if it appears that it did not exist, the Minister may so determine and declare, and thereupon the place comprised in the inspector's declaration, or affected thereby, shall cease to be deemed an infected place. 3 E. VII., c. 11, s. 19.

Notice to occupant.

17. Whenever, under this Act, an inspector makes a declaration which constitutes a place an infected place, he may also, if the circumstances of the case appear to him so to acquire, deliver a notice under his hand of such declaration to the occupiers of all lands and buildings adjoining thereto, any part whereof respectively lies within one mile of the boundaries of the infected place in any direction, and thereupon the provisions of this Act with respect to infected places shall apply to and have effect in respect of such lands and buildings as if the same were actually within the limits of the infected place. 3 E. VII., c. 11, s. 20.

Area of infected locality.

18. The area of an infected place may, in all cases of a declaration by the Minister, include any common, field, stable, cowshed or other premises in which infectious or contagious disease has been

found to exist, and such an area as to the Minister seems requisite; and the Minister may, from time to time, by order, extend or curtail the limits of an infected place beyond the boundaries of the common, field, stable, cowshed, farm or premises where infectious or contagious disease is declared or found to exist. 3 E. VII., c. 11, s. 21.

How area described.

19. The area of an infected place may, in any case, be described by reference to a map or plan deposited at some specified place, or by reference to townships, parishes, farms or otherwise. 3 E. VII., c. 11, s. 22.

Declaring a place free from disease.

20. The Minister may, at any time, upon the report of an inspector, by order, declare any place to be free from infectious or contagious disease; and thereupon, and from the time specified in that behalf in the order, the place shall cease to be deemed an infected place. 3 E. VII., c. 11, s. 23.

Order of Minister.

21. An order of the Minister relative to an infected place shall supersede any order of a local authority inconsistent with it. 3 E. VII., c. 11, s. 24.

Transit.

22. The provisions of this Act with respect to infected places, shall not restrict the moving of any person, animal or thing by railway or other mode of transport on highways through an infected place, if such person, animal or thing is not detained within the infected place, unless such transport is prohibited. 3 E. VII., c. 11, s. 2 5.

Removal from infected places.

23. Whenever under this Act a place has been constituted an infected place, no live animal, nor the flesh, head, hide, skin, hair, wool or offal of any animal or any part thereof, nor the carcass nor any remains of any animal, nor any dung of animals, nor any hay, straw, litter or other thing commonly used for and about animals, shall be removed out of the infected place, without a license signed by an inspector appointed as aforesaid, until said place has been released by order of the Minister. 3 E. VII., c. 11, s. 26.

CLEANSING OF VESSELS, VEHICLES AND PREMISES.

Vessels, etc., to be cleansed.

24. Every company and every person carrying for hire animals to or in Canada, shall thoroughly cleanse and disinfect, in such manner as the Governor in Council, from time to time, directs, all steamships, steamers, vessels, boats, pens, carriages, trucks, horse-boxes and vehicles used by such company or person for the carrying of animals; and the Governor in Council may cause any such steamship, steamer, vessel, boat, carriage, truck, horse-box or vehicle, to be detained at such place as to him seems meet, until it is so cleansed and disinfected. 3 E. VII., c. 11, s. 27.

Minister may cause the work to be done.

25. If the company or person using such steamship, steamer, vessel, boat, carriage, truck, horse-box or vehicle for the carrying of animals, fails to cause the same to be so cleansed and disinfected within such time after being notified so to do as the Minister directs,

the Minister may cause the same to be cleansed and disinfected at the expense of such company or person. 3 E. VII., c. 11, s. 27.

Premises to be in sanitary condition.

26. All yards, stables, sheds or other premises used by railway or steamship companies or other persons for the accommodation of animals shall be maintained in a clean, comfortable and sanitary condition, and shall be subject at all times to inspection by inspectors acting under the authority of the Minister, who, when they deem such action necessary, may order the cleansing and disinfection in a satisfactory manner of the said yards, stables, sheds or other premises. 3 E. VII., c. 11, s. 28.

Refusal to comply with orders of inspector.

27. In the event of any railway or steamship company or other person refusing or neglecting to carry out the orders of the inspector in regard to such cleansing or disinfection, or in the event of such company or person neglecting to maintain its yards, stables, sheds or other premises for the use of animals, in a clean, comfortable and sanitary condition, the inspector may condemn the said premises as unfit for use; whereupon the said premises shall not be used for the accommodation of animals until such time as the orders of the inspector in regard thereto have been satisfactorily carried out. 3 E. VII., c. 11, s. 28.

REGULATIONS.

Governor in Council may make regulations.

28. The Governor in Council may from time to time, make such regulations and orders as to him seem necessary for any of the following purposes, that is to say:—

Quarantine.

(*a*) For subjecting animals to quarantine, or for causing the same to be destroyed upon their arrival in Canada, or for destroying any hay, straw, fodder or other article whereby it appears to him that infection or contagion may be conveyed, and generally for regulating the importation or introduction into Canada of animals in such manner as to prevent the introduction of any infectious or contagious disease in Canada;

Separation.

(*b*) For the keeping separate, treatment and disposal of, and dealing generally with animals affected with infectious or contagious diseases, or suspected of being so affected, or which have been in contact with animals so affected or suspected of being so affected, and for the prevention of the spread of infectious or contagious diseases;

Districts of quarantine.

(*c*) For segregating and confining animals within certain limits, for establishing districts of inspection or of quarantine, and for prohibiting or regulating the removal to or from such parts of or places in Canada, as he designates in such regulations, of animals, or of meats, skins, hides, horns, hoofs or other parts of any animals, or of hay, straw, fodder or other articles likely to propagate infection:

Purification.

(*d*) For purifying any yard, stable, outhouse or other place, or any wagons, carts, carriages, cars or other vehicles, or any vessels, and for directing how any animals dying in a diseased state, or any animals, parts of animals, or other things seized under the provisions of this Act, are to be destroyed or otherwise disposed of:

(*e*) For causing notices to be given of the appearance of any disease among animals; Notice of disease.

(*f*) For requiring notice of the appearance of any such disease among animals; Requiring notice.

(*g*) For prohibiting or regulating the holding of markets, fairs, exhibitions or sales of animals; Prohibiting markets.

(*h*) For declaraing any market, railway yard, stock yard, pen, wharf, steamship, steam or other vessel, railway car or other vehicle, on or in which animals are exposed for sale, or are placed for the purpose of transit, to be infected, and for declaring the same to be no longer infected; Declaring market, etc., infected.

(*i*) For the slaughtering of animals as provided for by this Act; Slaughtering animals.

(*j*) For requiring proof of the fact that animals imported into or passing through Canada have not, at the time of their embarkation, been brought from any place or locality where any contagious or infectious disease is, at the said time, in existence; Proof as to animals imported.

(*k*) For exempting certain contagious and infectious diseases from the operation of certain specified clauses of this Act, and for dealing with the said diseases as may to him seem necessary and advisable; Certain exceptions.

(*l*) Generally, any orders which he thinks it expedient to make for the better execution of this Act, or for the purpose of, in any manner, preventing the spreading of and for the extirpation of contagious or infectious disease among animals, whether any such orders are of the same kind as the kinds enumerated in this section or not. Generally.

2. The Governor in Council may from time to time, define the limits of ports and of other circumscriptions for the purposes of this Act. 3 E. VII., c. 11, ss. 15, 29 and 30.

29. The Minister may, from time to time, make such regulations as to him seem necessary for preventing the removal, without a license signed by an inspector or other officer appointed as aforesaid, of live animals, or the hide, skin, hair, offal of any animals or any part thereof, the carcass or any remains of any animal, any dung of animals, and any hay, straw, litter or other thing commonly used for or about animals, out of an infected place. 3 E. VII., c. 11, s. 30. Preventing removal of animals.

30. Every regulation made under the provisions of this Act shall have the like force and effect as if it had been embodied in this Act. 3 E. VII., c. 11, s. 31. Effect of such orders.

PUBLICATION AND EVIDENCE.

31. Every order in council prohibiting the importation or the introduction of animals into Canada, or establishing quarantines for animals, ordering the slaughtering of animals or declaring any market, railway yard, stock yard, pen, wharf, steamship, steam or other vessel, railway car or other vehicle to be infected, and every order of the Minister declaring any place infected shall be published twice in the *Canada Gazette*. 3 E. VII., c. 11, s. 32. Publication of orders in council.

Orders in Council to be evidence.

32. An Order of the Governor in Council declaring any market, railway yard, stock yard, pen, wharf, steamship, steam or other vessel, railway car or other vehicle to be infected, or of the Minister, declaring a place to be an infected place, or a copy of the declaration of the Inspector certified by him, a notice of which has been delivered as required by this Act, shall be prima facie evidence of the existence of disease, or of the suspicion of such disease and other matters to which the order or declaration relates. 3 E. VII., c. 11, s. 33.

Proof of orders or regulations.

33. Any order or regulation made or issued under this Act, or under any order of the Governor in Council, or of the Minister, may be proved by the production of a printed or other copy of such order or regulation, certified by the Minister; and any such order or regulation shall, until the contrary is proved, be deemed to have been duly made and issued at the time at which it bears date. 3 E. VII., c. 11, s. 34.

Inspector's certificate.

34. The certificate of an inspector or an officer, as aforesaid, to the effect that an animal is affected with an infectious or contagious disease shall, for the purposes of this Act, be prima facie evidence of the matter certified. 3 E. VII., c. 11, s. 35.

OFFENCES AND PENALTIES.

Neglect to give notice.

35. Every person who neglects to give notice, as required by this Act, of any facts discovered or perceived by him indicating the appearance or the existence of infectious or contagious disease among animals owned by him or under his special care, or who conceals the existence of infectious or contagious disease among animals, shall incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, ss. 3 and 4.

Keeping diseased animal.

36. Every person who turns out, keeps or grazes in or upon any forest, wood, moor, beach, marsh, common, waste-land, open field, road-side, or other undivided or unenclosed land, any animal, knowing it to be infected with or labouring under any infectious or contagious disease, or to have been exposed to infection or contagion, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, s. 5.

Bringing such animals to market.

37. Every person who brings or attempts to bring into any market, fair or other place, any animal known by him to be infected with or labouring under any infectious or contagious disease, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, s. 6.

Selling or putting off such animals.

38. Every person who sells or disposes of, or puts off, or offers or exposes for sale, or attempts to dispose of or put off any animal infected with or labouring under any infectious or contagious disease or the meat, skin, hide, horns, hoofs or other parts of an animal infected with or labouring under any infectious or contagious disease at the time of its death, whether such person is the owner of the animal, or of such meat, skin, hide, horns, hoofs or other parts of such an animal or not, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, s. 7.

Throwing carcasses into rivers, etc.

39. Every person who throws or places, or causes or suffers to be thrown or placed, in any river, stream, canal, navigable or other water, or in the sea, within ten miles of the shore, the carcass of an animal which has died of disease, or which has been slaughtered as diseased or as suspected of disease, shall for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, s. 8.

Digging up any such carcasses, when buried.

40. Every person who, without lawful authority or excuse, digs up or causes or allows to be dug up the buried carcass of an animal which has died or is suspected of having died from infectious or contagious disease, or which has been slaughtered as diseased or as suspected of disease, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII. c. 11 s. 9.

Impeding execution of this Act.

41. Every person who refuses to admit any inspector or other officer into any place or premises or any steamship, vessel or boat, or any carriage, car, truck, horse-box, or other vehicle used for the carriage of animals, or who obstructs or impedes the execution of any order or regulation made by the Governor in Council or the Minister under this Act, shall, for every such offence incur a penalty not exceeding one hundred dollars; and the inspector or other officer may apprehend the offender and take him forthwith before a justice of the peace to be dealt with according to law; but no person so apprehended shall be detained in custody, without the order of a justice, longer than twenty-four hours. 3 E. VII., c. 11, s. 37.

Forfeiture of animals imported contrary to order in council.

42. If any animals are imported or introduced, or attempted to be imported or introduced into Canada, contrary to the provisions of any order or regulation made in pursuance of this Act, the animals shall be forfeited and may be forthwith destroyed or disposed of, as the Minister or any person employed by him in that behalf directs; and every person who imports or introduces, or attempts to import or introduce, any animal into Canada, contrary to the provisions of any such order or regulation, shall incur a penalty not exceeding two hundred dollars, for every animal so imported or introduced, or attempted to be imported or introduced by him. 3 E. VII., c. 11, s. 38.

Unlawful removal of any animal.

43. Every person who moves, or causes or allows to be moved, any animal, hide, skin, hair, wool, horn, hoof, offal, carcass, meat, dung, hay, straw, litter or other thing in violation of the provisions of this Act with respect to infected places, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, s. 39.

Entering when entrance is forbidden.

44. Whenever a person having animals in his possession or keeping within a district wherein infectious or contagious disease exists, affixes at the entrance to a building or inclosed place in which such animals are kept, a notice forbidding persons to enter into that building or place without his permission, any person not having a right of entry or way into that building or place who knowingly enters into the same, or any part thereof, in violation of the notice,

shall, for every such offence, incur a penalty not exceeding twenty dollars. 3 E. VII., c. 11, s. 40.

Neglect to cleanse vessel.

45. Every person who fails to comply with the requirements of any order made under the authority of this Act respecting the cleansing and disinfecting of steamships, vessels, boats, pens, carriages, trucks, horse-boxes or vehicles used by such person for the carriage of animals, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, s. 41.

Violation of regulations.

46. Every person who violates any provision of this Act, or of any regulation made by the Governor in Council or by the Minister, under the authority of this Act, in respect to which no penalty is hereinbefore provided, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 3 E. VII., c. 11, s. 42.

PROCEDURE.

Place of trial.

47. Every offence against this Act, or against any order or regulation of the Governor in Council, or of the Minister, and every cause of complaint under this Act, may be prosecuted and tried either in the place in which such offence or cause of complaint was committed or arose, or in any place in which the person charged or complained against happens to be. 3 E. VII., c. 11, s. 44.

Recovery of penalties.

48. Every penalty imposed by this Act shall be recoverable, with costs, before any two justices of the peace, or any magistrate having the powers of two justices of the peace, under Part XV. of the Criminal Code. 3 E. VII., c. 11, s. 45.

HEALTH OF ANIMALS BRANCH

QUARANTINE REGULATIONS.

Authorized by Order in Council, dated 30th November, 1909.

As Amended by Order in Council of 19th August, 1911.

INTERPRETATION.

Sec. 1. In these Regulations, unless the context otherwise requires:—

(*a*) The expression 'the Minister' means the Minister of Agriculture;

(*b*) The expression 'inspector' means a veterinary or other inspector duly appointed under the provisions of the Animal Contagious Diseases Act;

(*c*) The expression 'veterinary inspector' means a duly qualified veterinary surgeon appointed an inspector under the provisions of the Animal Contagious Diseases Act;

(*d*) The expression 'inspection' means an inspection made by a duly authorized inspector;

(*e*) The expression 'contagious' means communicable by close contact or inoculation;

(*f*) The expression 'infectious' means communicable in any manner;

(*g*) The expression 'infectious or contagious disease' includes, in addition to other diseases generally so designated, glanders, farcy, maladie du coït, contagious pleuro-pneumonia, foot and mouth disease, rinderpest, anthrax, Texas fever, hog cholera, swine plague, mange, scab, rabies, tuberculosis, actinomycosis and variola ovina.

Sec. 2. The Veterinary Director General is in charge of the Health of Animals Branch of the Department of Agriculture.

Sec. 3. The following Customs ports are hereby declared to be Animals Quarantine Stations, and all animals imported into Canada subject to quarantine must be entered through said Stations, viz.:—Halifax, Yarmouth, N.S.; St. John and McAdam Junction, N.B.; Charlottetown, P.E.I.; Sherbrooke and St. Johns, Que.; Bridgeburg, Windsor, Sarnia, Sault Ste. Marie and Fort Frances, Ont.; Emerson, Gretna and Bannerman, Man.; North Portal, Wood Mountain, Big Muddy and Willow Creek, Sask.; Pendant d'Oreille, Coutts and Twin Lakes, Alta.; Gateway, Kingsgate, Rossland, Nelson, Grand Forks, Midway, Myncaster, Keremeos, Osoyoos, Huntingdon, New Westminster, White Rock, Vancouver and Victoria, B.C.; Whitehorse, Y.T. Quebec is also declared to be an Animals' Quarantine Station in so far as importations into Canada by sea are concerned.

Sec. 4. Animals subject to inspection only, but which are not subject to quarantine, may enter through the aforesaid and at the following ports:—Pictou, North Sydney, N.S.; St. Stephen's, Woodstock, Edmundston, Grand Falls, St. Leonards, Debec Junction, Florenceville and Aroostook Junction, N.B.; Comin's Mills, Lake Megantic, Beauceville, Coaticooke, Beebe Junction, Highwater, Abercorn, St. Armand, Lacolle Junction, Noyan Junction, Athelstan, Dundee and St. Agnes de Dundee, Que.; Cornwall, Prescott, Morrisburg, Brockville, Kingston, Cobourg, Toronto,

Niagara Falls, Port Arthur, Rainy River, Ont.; Snowflake, Man.; Marienthal, Sask.; Rykerts, Bridesville, and Nanaimo, B.C.

Sec. 5. The Minister of Agriculture is hereby empowered to cancel as quarantine and inspection stations any of the places above named and to select such other sites in exchange for, or in addition to, the above as he may from time to time deem expedient.

IMPORTATIONS IN GENERAL.

Sec. 6. The Minister may prohibit or regulate the importation of animals from any country or any district where he has reason to believe that contagious disease of animals exists.

Sec. 7. (*a*) Persons contemplating the importation of animals from any part of the world, except the United States and Newfoundland, must first obtain from the Minister a permit therefor. Such permits shall not be available at any port other than the one mentioned therein.

(*b*) Applications for such permits shall be in writing, and shall state the number and kind of animals for which the permit is applied, the country of origin and probable date of shipment, the port of embarkation, the port at which the animals are to be landed and the approximate date of their arrival. The statements contained therein may be required to be verified on oath, the Minister deciding in every case whether a permit will be granted.

(*c*) Animals from countries other than those above mentioned arriving at any port in Canada without such permit shall not be admitted to Canada unless and until ordered by the Minister.

(*d*) Unless otherwise ordered by the Minister, the provisions of this section shall not apply to the importation of horses from any of the countries of Europe.

Sec. 8. The importation by sea into Canada of animals from all countries, other than the United States, Newfoundland and Mexico, is prohibited except at the ports of Victoria and Vancouver, B.C.; Quebec, Que.; St. John, N.B.; Halifax, N.S.; Charlottetown, P.E.I., and such other ports as may hereafter be indicated by the Minister.

Sec. 9. Animals imported via United States ports must be accompanied not only by the necessary health certificates from the country of origin, but also by a certificate of quarantine or inspection signed by a Veterinary Inspector of the United States Bureau of Animal Industry.

Sec. 10. Persons in charge of vessels conveying animals to Canada must immediately on arrival in port, notify the Superintendent of the Animals Quarantine Station of the arrival of such vessel and the number and kind of animals on board thereof.

Sec. 11. All importers must certify under oath, before making Customs entry, the place of origin of the animals imported by them.

Sec. 12. All animals arriving in Canada through any of the above mentioned ports on the Canadian seaboard shall be subject to inspection on arrival by inspectors who may, from time to time, be appointed for that purpose.

Sec. 13. All inspections of imported animals must be made in daylight.

Sec. 14. For the purpose of carrying out these Regulations, inspectors shall have free access to any wharf, vessel, car, or to any place where animals may be found.

Sec. 15. Inspectors shall visit the vessels or cars conveying animals into the said ports, and after inspecting such animals and finding them free from disease, shall superintend their landing or unloading, order them to be placed and disposed of according to the requirements of the case, and see that those to be quarantined are conveyed to the proper quarantine station. Inspectors shall also superintend the landing, unloading and disposal of fodder, litter, blankets, troughs and other articles which may have been used by or for the said animals.

Sec. 16. Importers of animals will be required to certify under oath that the health certificates referred to in these Regulations apply to the said animals and to no other, and that the district named is the actual one from which these animals came.

Sec. 17. Any unauthorized interference with animals after inspection, whether by substitution or otherwise, or any evasion, or misrepresentation, will be deemed a breach of these Regulations, and in addition will render the shipment liable to seizure and detention pending the orders of the Minister as to its disposal.

Sec. 18. Inspectors may, if they deem it necessary, order the cleansing and purifying of any vessel, place, vehicle, building or article, and direct such precautionary measures to be taken as they may consider advisable pending the decision of the Minister as to the ultimate disposal of such vessel, place, vehicle, building or article.

Sec. 19. No person shall import or introduce, or attempt to import or introduce, into Canada, any animal contrary to these Regulations or which is affected with any contagious or infectious disease, and any animal which is imported or introduced, or attempted to be imported or introduced, into Canada contrary to these Regulations or which is affected with or suspected of being affected with any contagious or infectious disease, may be forthwith destroyed, refused admission to Canada, or otherwise disposed of as the Veterinary Director General may direct.

Sec. 20. The importation of head ropes which have been used for tying up cattle is prohibited, and all vessels carrying or having on board such head ropes in contravention of this Regulation shall be liable to be declared to be infected under the Animal Contagious Diseases Act.

Sec. 21. The importation of the manure of swine is prohibited.

Sec. 22. Any inspector may declare any railway car, or other land or water conveyance bringing animal manures into Canada, an infected place within the meaning of the provisions of the Animal Contagious Diseases Act, whenever he shall have reason to believe or to have well founded suspicion that such may be a source of danger as respects the introduction of disease; and the unloading of such car or other land or water conveyance shall be in consequence prohibited until otherwise ordered in accordance with the provisions of the said Act.

HORSES, MULES AND ASSES.

Sec. 23. Horses, mules and asses imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no glanders, maladie du coît or other serious infectious or contagious disease affecting horses has existed in said district for a perod of six months prior to their shipment.

Sec. 24. Horses, mules and asses imported from countries other than the United States, Newfoundland and Mexico, consigned to Montreal, may be, unless otherwise ordered by the Minister, inspected at that port. Such animals landing at any of the other ports named shall be inspected at such ports.

CATTLE.

Sec. 25. Cattle imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no contagious pleuro-pneumonia, rinderpest or foot and mouth disease has existed in said district for a period of six months prior to their shipment.

Sec. 26. (*a*) A quarantine of thirty days shall be enforced upon cattle imported from the United Kingdom, to be counted from the date of arrival at the quarantine station.

(*b*) A quarantine of ninety days shall be enforced upon cattle imported from all other countries except the United States, Newfoundland and Mexico, to be counted from the date of clearance of the vessel carrying the same from the port at which they were embarked.

OTHER RUMINANTS.

Sec. 27. Sheep and goats imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no foot and mouth disease has existed in said district for a period of six months prior to their shipment.

Sec. 28. A quarantine of thirty days shall be enforced upon all sheep and goats imported from countries other than the United States, Newfoundland and Mexico, to be counted from the date of clearance of the vessel carrying the same from the port at which they were embarked.

SWINE.

Sec. 29. Swine imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no hog-cholera, swine-plague or foot-and-mouth disease has existed in said district for a period of six months prior to their shipment.

Sec. 30. A quarantine of thirty days shall be enforced upon all swine imported from countries other than the United States, Newfoundland and Mexico, to be counted from the date of clearance of the vessel carrying the same from the port at which they were embarked.

IMPORTATION OF ANIMALS FROM THE UNITED STATES, NEWFOUNDLAND AND MEXICO.

Sec. 31. All animals imported into the Dominion of Canada from the United States, Newfoundland and Mexico, must be accompanied by a statutory declaration or affidavit made by the owner or importer, stating clearly the purpose for which said animals are imported, viz.: whether for breeding purposes, for milk production, for work, for grazing, feeding or slaughter, or whether they form part of settlers' effects, or whether they are entered for temporary stay, as provided by these Regulations.

Sec. 32. Said declaration or affidavit must be presented to the Collector of Customs at the port of entry, who will decide whether the animals are entitled to entry under these Regulations, and who will notify the Veterinary Inspector of the Department of Agriculture in all cases where the Regulations require an inspection to be made.

ANIMALS FROM THE UNITED STATES.

HORSES, MULES AND ASSES.

Sec. 33. The importation of branded or range horses, mules and asses, other than those which are gentle and broken to harness or saddle, is prohibited.

Sec. 34. Horses, mules or asses, shall be inspected, and if so ordered by the Minister, may be detained, isolated, dipped, or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that the animals are affected with, or have been exposed to contagious or infectious disease.

Sec. 35. Horses, mules and asses must be accompanied by;—

(*a*) A satisfactory certificate of mallein test dated not more than thirty days prior to the date of entry, and signed by an inspector of the United States Bureau of Animal Industry; or,

(*b*) A similar certificate from a reputable veterinarian, provided such certificate is endorsed by an inspector of the said Bureau of Animal Industry; or,

(*c*) A similar certificate from an inspector of the Canadian Department of Agriculture.

When not so accompanied, such horses, mules or asses must be submitted to the mallein test either at the quarantine station where entry is made, or, under such restrictions as the Veterinary Director General may prescribe, at point of destination.

Sec. 36. When tested at the port of entry, if any reactors are found they shall be slaughtered without compensation, or definitely marked and returned to the United States, and must not again be presented for entry. All horses, mules or asses in the same consignment shall be returned to the United States, but the non-reactors may be again presented for entry and further test after the lapse of a period of not less than fifteen days from the date of the first test, provided that satisfactory evidence is produced to the effect that they have not, during the said period, been in contact with affected animals. When tested at destination points, all animals reacting to the test will be slaughtered without compensation, while those comprising the rest of the shipment will be detained in quarantine until it is shown to the satisfaction of the Veterinary Director Genral that they are free from disease.

Sec. 37. No compensation will, under any circumstances, be paid for horses reacting to mallein within six months after the date of their importation into Canada.

CATTLE.

Sec. 38. All cattle shall be inspected, and if so ordered by the Minister, may be detained, isolated, submitted to the tuberculin test, dipped or otherwise treated, or in default of such order, where the inspector has reason to believe or suspect that animals are affected with or have been exposed to contagious or infectious disease.

Sec. 39. Cattle for breeding purposes and milk production six months old or over, if unaccompanied by a satisfactory tuberculin test chart dated not more than thirty days prior to the date of entry and signed by a veterinarian of the United States Bureau of Animal Industry, must be detained in quarantine for one week or such further period as may be deemed necessary, and subjected to the tuberculin test; cattle reacting thereto must be returned to the United States or slaughtered without compensation.

Sec. 40. Importers may be required to furnish a statutory declaration that the chart produced applies to the cattle it purports to describe and no other.

OTHER RUMINANTS.

Sec. 41. All sheep and goats shall be inspected, and, if so ordered by the Minister, may be detained, isolated, dipped or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that the animals are affected with or have been exposed to contagious or infectious disease.

SWINE.

Sec. 42. All swine must be accompanied by a certificate signed by a veterinarian of the United States Bureau of Animal Industry, stating that neither swine plague nor hog cholera has existed within a radius of five miles of the premises in which they have been kept for a period of six months immediately preceding the date of

shipment, but such swine shall nevertheless be inspected, and shall be subjected to a quarantine of thirty days before being allowed to come in contact with Canadian animals.

ANIMALS FOR EXHIBITION.

Sec. 43. Animals other than swine may be admitted on inspection at quarantine and inspection ports only, for purposes of exhibition or other temporary stay, subject to the usual Customs regulations.

ANIMALS FOR TRANSIT THROUGH CANADA.

Sec. 44. Animals may be admitted from any part of the United States into Canada for transit to any other part of the United States in bond, and (with the exception of swine) will be admitted to Canada in bond for transit to any Canadian port for exportation by sea to Europe or elsewhere. Such animals are to be subject to inspection at the Canadian port of shipment.

Sec. 45. The transit of such animals shall be subject to such regulations as the Minister shall, from time to time, prescribe.

ANIMALS FROM MEXICO.

Sec. 46. Any person contemplating the importation of animals from Mexico must, in addition to all other requirements of this order, first obtain from the Minister a permit therefor.

Applications for such permits shall be in writing, and shall state the number and kind of animals to be imported, the district and state in Mexico whence they are to be shipped and the probable date of their arrival at and the name of the Canadian port of entry. The statements contained therein may be required to be verified on oath, the Minister deciding in every case whether a permit will be granted.

MEXICAN ANIMALS BONDED THROUGH UNITED STATES TERRITORY FOR ADMISSION TO CANADA.

Sec. 47. Animals passing in bond through United States territory for importation into Canada must be accompanied by a certificate of health signed by a veterinarian of the United States Bureau of Animal Industry, and by an affidavit from the owner or importer that the said certificate refers to the animals in question. Such animals shall nevertheless be subject to inspection, and if necessary to detention, before being permitted to enter Canadian territory. If found diseased such animals are to be subject to and dealt with according to the orders of an inspector under instructions from the Veterinary Director General.

HORSES, MULES AND ASSES.

Sec. 48. The importation of branded or range horses, mules and asses other than those which are gentle and broken to harness or saddle is prohibited.

Sec. 49. All horses, mules and asses shall be inspected and shall be submitted to the mallein test before being allowed to enter Canada. If any reactors are found they shall be slaughtered without compensation.

CATTLE.

Sec. 50. All cattle shall be inspected and if so ordered by the Minister may be detained, isolated, submitted to the tuberculin test, dipped or otherwise treated, or, in default of such order where the inspector has reason to believe or suspect that animals are affected with or have been exposed to contagious or infectious disease.

OTHER RUMINANTS.

Sec. 51. All sheep and goats shall be inspected, and if so ordered by the Minister may be detained, isolated, dipped or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that the animals are affected with or have been exposed to contagious or infectious disease.

SWINE.

Sec. 52. All swine shall be inspected and shall be subjected to a quarantine of sixty days before being allowed to come in contact with Canadian animals.

ANIMALS FROM NEWFOUNDLAND.

Sec. 53. All animals imported from Newfoundland shall be inspected and if so ordered by the Minister, may be detained, isolated, tested, dipped or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that animals are affected with or have been exposed to contagious disease.

REGULATIONS OF QUARANTINE.

Sec. 54. Quarantine stations shall be under the care and subject to the orders of the officers appointed for that purpose hereinafter referred to as superintendents, who shall have the general superintendence and control of the servants or other persons, and of all other matters connected therewith.

Sec. 55. Animals in any quarantine station shall be treated and dealt with under the direction of the superintendent of the said station and all articles used for, about or in connection with the said animals shall be in like manner subject to his direction and supervision.

Sec. 56. Cattle six months old or over imported from countries other than the United States, Newfoundland and Mexico shall not be discharged from quarantine until they have been submitted to the tuberculin test by the superintendent of the quarantine or other duly authorized officer.

Sec. 57. Cattle reacting to the tuberculin test, but not showing clinical symptoms, shall be permanently marked in the right ear with the letter 'T' by the officer making the test, and may then be released at the expiry of the prescribed period of quarantine if found free from all other infectious or contagious diseases.

Sec. 58. Cattle showing clinical symptoms of tuberculosis shall be destroyed or otherwise disposed of as the Minister may direct.

Sec. 59. The Minister or the Veterinary Director General may authorize the destruction of any quarantined animal or all or any portion of the articles used in the care of the said animals, and such destruction shall take place under the supervision of the superintendent, and in the manner prescribed by him.

Sec. 60. The expenses of feeding, treating and caring for animals detained in quarantine, with the exception of those for the use of grounds and shelters, shall be borne by the owner or importer, and such expenses shall be paid before the animals are permitted to leave the quarantine, and in default of such payment within fourteen days after the expiration of the period of quarantine, the superintendent may, on fourteen day's notice in writing, delivered or sent by mail to the owner or importer, cause the said animals to be sold to meet the said expenses, together with the expenses of and incidental to the sale of the said animals, the balance, if any, to be handed over to the owner.

Sec. 61. No animal under quarantine shall be allowed to come in contact with any Canadian animal until duly discharged from quarantine.

Sec. 62. No animal under quarantine shall be removed from a quarantine station until duly discharged therefrom by the superintendent or other duly authorized officer.

Sec. 63. No person shall remove or attempt to remove any animal from a quarantine station without the authority of the superintendent or other duly authorized officer.

Sec. 64. No indemnity shall be allowed for any injury or loss sustained in connection with any animals while detained in quarantine.

EXPORTATION.

Sec. 65. Canadian animals for transit to any shipping port of the United States for export by sea to Europe or elsewhere, must be inspected at such places in Canada as the Minister may, from time to time designate; must not be shipped from the place of inspection until they have been certified by a duly authorized veterinary inspector to be free from infectious and contagious disease and otherwise fit for export, and must not be permitted by collectors of customs to leave Canada unless accompanied by such certificate.

Sec. 66. Animals for exportation by sea should, if possible, reach the port of exportation not less than twelve hours before shipment for rest and inspection. Animals failing to do so shall be liable to detention in the discretion of the inspector.

Sec. 67. Inspectors shall at all times have full power to detain animals for such time as they consider sufficient to enable them to make a thorough and satisfactory inspection and to ascertain that all the provisions of these Regulations relating thereto have been duly observed and complied with.

Sec. 68. Owners or persons in charge of animals for exportation shall give twenty-four hours notice, addressed to the inspector at his office, stating the number and kind of such animals and the expected time of their arrival at the port of exportation.

Sec. 69. No animals except as hereinafter provided, shall be permitted to be placed on board any steamship or other vessel for exportation at any Canadian port until they have been inspected and approved by a duly authorized veterinary inspector at such port and certified by him to be free from contagious disease and in every way fit for export; such inspection to be made within twenty-four hours of embarkation.

Sec. 70. For the purpose of carrying out these Regulations, inspectors shall have free access to any wharf, vessel, car or to any place where animals may be found.

Sec. 71. All inspections for export must be made in daylight.

Sec. 72. Owners or shippers of stock during the progress of inspection at any port of exportation shall, with the means at their disposal, give every required assistance to the inspector at such port, and move the animals according to his directions. In case the owner or shipper refuses or neglects to furnish the necessary assistance, the inspector may employ men at the cost of the owner or shipper, and such cost shall be paid to the inspector before a clean bill of health is given.

Sec. 73. Any unauthorized interference with animals after inspection, whether by substitution or otherwise, or any other evasion, or misrepresentation, will be deemed a breach of these Regulations.

Sec. 74. Inspectors may, if they deem it advisable for purposes of identification, mark animals inspected by them. A certificate of inspection, stating the name of the owner, the number, sex and class of animals in the consignment and certifying to their freedom from contagious disease, will be furnished by the inspector, and must be produced to the Collector of Customs before embarkation.

Sec. 75. Such animals as may have been exposed to contagious or infectious disease or affected with or suspected of being affected with contagious or infectious

disease, shall be detained and dealt with according to the orders of the inspector under instructions from the Veterinary Director General.

Sec. 76. Inspectors may reject animals for any reasonable cause.

Sec. 77. The Minister may from time to time order that the provisions of these Regulations requiring the inspection and certification as aforesaid, may be waived when in his opinion such action is necessary and desirable.

Sec. 78. The Collector of Customs of any port in Canada whence animals are exported shall not give a clearance to any ship having animals on board for exportation, other than those exempted by ministerial order under the provisions of the preceding section, without having produced to him a certificate, signed by an inspector, to the effect that the animals therein referred to are free from contagious and infectious disease and in every way fit for shipment.

INFECTED VESSELS.

Sec. 79. Vessels which have carried cattle, sheep or other ruminants, among any of which 'foot and mouth disease' shall have been found, shall be prohibited, for a period of sixty days thereafter, from loading cattle, sheep or other ruminants or swine, in any Canadian port; and, further, until such vessel shall have been thoroughly cleansed and disinfected, under the supervision of an inspector or other duly authorized officer.

CUSTOMS OFFICERS.

Sec. 80. Collectors of Customs throughout Canada shall see that the various exigencies and requirements of the present order, or any ministerial or other order made thereunder, are fulfilled before granting any permit which requires before it is given, any act to be performed or any inspection or other proceeding to be made or taken, and they shall see that the prohibitions prescribed and rules established by this order as hereinbefore mentioned, and the instructions which may be issued by the Minister, are obeyed, and in case of any infraction of the provisions of the present order, or any of them, taking place, they shall report at once to the Minister the nature and extent of such infraction.

GENERAL PROVISIONS.

Sec. 81. To provide against the possibility of diseased animals being carried from place to place, through Canadian territory, or conveyed to and shipped from ports, it is ordered as follows:—

An inspection of animals may be made at any place or time by any veterinary inspector under authority from the Veterinary Director General.

Sec. 82. Such animals as may be found affected with or to have been exposed to contagious or infectious disease shall be dealt with according to the provisions of the Animal Contagious Diseases Act.

Sec. 83. On infectious or contagious disease of animals being discovered on board any steamship, vessel or car, or in any stable, shed, yard ,or other place, it shall be the duty of the inspector, on the removal of the infected animal or animals, to superintend the thorough disinfection of such steamship, car, stable, shed, yard or other place, without loss of time, in a manner satisfactory to an inspector.

Sec. 84. All yards, stables, sheds or other premises used by railway or steamship companies or other persons, for the accommodation of animals shall be maintained in a clean, comfortable and sanitary condition and shall be subject at all times to inspection by inspectors acting under the authority of the Minister, who, when they

deem such action necessary, may order the cleansing and disinfection in a satisfactory manner of the said yards, stables, sheds or other premises as provided in the Animal Contagious Diseases Act.

Sec. 85. In the event of any owner, lessee or occupant of any yard, stable, shed or other premises or any railway or steamship company or person refusing or neglecting to carry out the orders of the inspector in regard to cleansing and disinfection as aforesaid or in the event of such owner, lessee or occupant, company or person neglecting to maintain his or its yards, stables, sheds or other premises for the use of animals, in a clean, comfortable and sanitary condition, the inspector may condemn the said premises as unfit for use, whereupon the said premises shall not be used for the accommodation of animals until such time as the orders of the inspector in regard thereto have been satisfactorily carried out.

Sec. 86. Stock cars or other vehicles used for the conveyance of live stock shall be cleansed and disinfected at such times and places as the Minister may order. Such disinfection shall be done by the thorough cleansing of the car and its subsequent whitewashing with lime and carbolic acid in the proportion of 1 pound commercial carbolic acid to 5 gallons of lime-wash or such other process as may be approved by the Veterinary Director General.

Sec. 87. Any inspector may at any time when he deems such action necessary or advisable, order any steamship, steam, or other vessel, railway car, or other vehicle, used for the conveyance of animals to be cleansed and disinfected to his satisfaction, as provided by Section 86, at the expense of the person or company owning or operating same, and may prohibit the use or removal of such vessel, car, or other vehicle, until his orders in regard to cleansing and disinfection have been properly carried out. Shippers may refuse to place their animals on any unclean or unsanitary vessel, car or other vehicle and may lodge a complaint with the nearest inspector, who, if he deems such action necessary or advisable, may exercise the powers conferred upon him by this section.

Sec. 88. The Minister may from time to time make such orders, not inconsistent with the provisions of this order as may appear to him necessary or expedient.

Sec. 89. Any person who violates any provision of this order, shall incur the penalties prescribed by the Animal Contagious Diseases Act.

MINISTERIAL ORDER No. 33.

Under and by virtue of the authority conferred upon me by the provisions of the Order in Council of November 30, 1909, containing regulations relating to Animals Quarantine, I do hereby order that:—

1. All stock cars intended for the conveyance of animals from any point in Canada to the United States, or for transit through United States territory to any other part of Canada, must be thoroughly cleansed and disinfected before such animals are placed therein.

2. All cars conveying animals into Canada from the United States, whether such animals are intended for points in Canada or for transit to some other part of the United States, must be inspected, and unless found in a clean and sanitary condition will be returned to the United States.

3. All stock cars, whether of Canadian origin or not, and whether empty or conveying merchandise other than live stock, entering Canada from the United States must, if not already showing evidence of having been so treated, be thoroughly cleansed and disinfected to the satisfaction of an inspector of this department, otherwise they will be returned to the United States.

This provision shall not apply to empty stock cars, bonded and sealed with a customs seal, entering Canada from the United States in transit to some other part of the United States.

4. Stock cars which have conveyed animals from the United States to points in Canada must be thoroughly cleansed and disinfected immediately after being unloaded, and before being returned to the country whence they came.

5. All hogs entering Canada for transit and all cars conveying such hogs must be inspected by the inspectors of this department immediately after entering Canadian territory. Any cars containing hogs showing evidence of disease, and any cars which are dirty or which do not, in the opinion of the inspector, meet in every way the requirements of the regulations of this department, are to be immediately returned to the United States.

6. All inspections, as provided above, must be made between the hours of 8 a.m. and 4 p.m.; provided that should any railway company furnish artificial lighting and other facilities satisfactory to the department, inspections may be made for such company at any hour, on due notice being given to the inspector on duty for the time being.

7. All cars conveying swine from the United States into Canada intended for transit to some other part of the United States, must be fitted with ten-inch foot boards in a manner satisfactory to the inspectors of this department.

8. The practice of douching or drenching with water United States hogs, or cars containing United States hogs, while in transit through Canada is strictly prohibited.

9. United States hogs while in transit through Canada must not be unloaded from cars containing them on any pretext whatever.

10. Any animal dying from any cause whatever when in transit through Canada from one point in the United States to another in that country, must not be removed from the car in which it died while in Canadian territory.

(Signed) GEO. F. O'HALLORAN,
Deputy Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
OTTAWA, December 1, 1909.

MINISTERIAL ORDER No. 34.

Under and by virtue of the authority conferred upon me by the provisions of the Order in Council of November 30, 1909, containing regulations relating to Animals Quarantine, I do hereby order that:—

1. All range cattle entering Canada from the United States except for transit in bond, shall be detained at the port of entry, and dipped or otherwise treated to the satisfaction of an inspector.

2. In cases where dipping or treatment is not performed by owners or importers at their own expense, inspectors are authorized to charge the actual cost of treatment, with a maximum charge of 25 cents for each animal so treated.

3. Cattle accompanied by a certificate from an inspector of the United States Bureau of Animal Industry stating that they are not affected with and have not been exposed to the contagion of mange, or that they have, within the thirty days preceding the date of their arrival at the Canadian boundary, been dipped or otherwise treated in a manner satisfactory to the officers of the said Bureau of Animal Industry, may be admitted without treatment.

4. The above order shall not apply to domestic cattle the property of settlers or others, which have not been in contact with animals affected or suspected of being affected, and which, on inspection, show no evidence of being themselves affected with mange.

(Signed) GEO. F. O'HALLORAN,
Deputy Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
OTTAWA, December 1, 1909.

MINISTERIAL ORDER No. 35.

Under and by virtue of the authority conferred upon me by the provisions of the Order in Council of November 30, 1909, containing regulations relating to Animals Quarantine, I do hereby order that:—

1. All Canadian animals intended for export to Europe via United States ports must be inspected by a regularly appointed veterinary inspector of this department, and must not be permitted to leave Canada unless accompanied by a certificate of the said inspector to the effect that they are free from contagious and infectious disease, and otherwise fit for export.

2. Shipments of such animals originating in, or passing through Toronto, must be inspected in Toronto.

3. Shipments routed via Montreal, other than those accompanied by a certificate of veterinary inspection at Toronto, must be inspected at Montreal.

4. Shipments not inspected at Toronto or Montreal must be inspected and certified in a similar manner by a regularly appointed veterinary inspector at the place of crossing the international boundary.

5. Railway companies handling animals for export via United States seaports must furnish facilities for unloading, inspection and reloading of animals at boundary points, and except at places specially mentioned above, must give due notice of intended shipments, so as to ensure prompt inspection and the avoidance of delay.

6. All inspections must be made by daylight.

(Signed) GEO. F. O'HALLORAN,
Deputy Minister of Agriculture,

DEPARTMENT OF AGRICULTURE,
OTTAWA, December 1, 1909.

MINISTERIAL ORDER No. 36.

Under and by virtue of the authority conferred upon me by the provisions of the Order in Council of November 30, 1909, containing regulations relating to Animals Quarantine, I do hereby order that:—

1. All sheep originating in that part of the province of Ontario lying west and south of a line commencing at the southeast corner of the county of Ontario, thence in a northerly direction along the eastern boundary of the said county to the northeast corner thereof, thence in a westerly direction along the northern boundary of the said county to the Severn river, thence along the Severn river to the Georgian Bay; as also all sheep originating in Manitoulin island, or any of the other Canadian islands in Lake Huron, must, if consigned to points in the United States, whether intended for export to Europe or not, be inspected by a regularly appointed veterinary inspector of this department.

2. Shipments of such sheep originating in or passing through Toronto, not routed via Montreal, may be inspected in Toronto.

3. Shipments routed via Montreal must be inspected at Montreal.

4. Shipments not inspected at Toronto or Montreal must be inspected and certified in a similar manner by a regularly appointed veterinary inspector at the place of crossing the international boundary.

5. Railway companies handling sheep for export from Ontario to the United States must furnish proper facilities for the unloading, inspection and reloading of sheep at boundary points, and except at the places specially mentioned above, must give due notice of intended shipments, so as to ensure prompt inspection and the avoidance of delay.

6. All inspections must be made by daylight.

7. This order shall not apply to sheep for breeding, grazing or feeding which are accompanied by a certificate signed by a Canadian official veterinarian stating that no contagious disease affecting sheep has existed in the district in which the animals have been kept for six months preceding the date of exportation, or by a certificate signed by a regularly appointed inspector of this department stating that the animals have been twice dipped in one of the official dips approved by the Secretary of the United States Department of Agriculture.

(Signed) GEO. F. O'HALLORAN,
Deputy Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
OTTAWA, December 1, 1909.

MINISTERIAL ORDER No. 37.

Under and by virtue of the authority conferred upon me by the provisions of the Order in Council of November 30, 1909, containing regulations relating to Animals Quarantine, I do hereby order that:—

1. All empty stock cars arriving at or passing through any of the places hereinafter mentioned shall, unless bearing evidence of having previously been so treated, be cleansed and disinfected under the supervision of an inspector before being allowed to proceed:—

Halifax, N.S.; St. John, N.B.; Montreal, Que.; Toronto, Ont.; Winnipeg, Man.; Moosejaw, Sask.; Medicine Hat, Lethbridge, Calgary, Edmonton and Strathcona, Alta.; Cranbrook, Nelson, Revelstoke and Vancouver, B.C.

(Signed) GEO. F. O'HALLORAN,
Deputy Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
OTTAWA, December 1, 1909.

MINISTERIAL ORDER No. 40.

Under and by virtue of the authority conferred upon me by section 41 of the Regulations relating to Animals Quarantine, authorized by Order in Council of date the 30th November, 1909, I do hereby order that all sheep imported to Canada from the United States for purposes other than immediate slaughter shall be admitted only at quarantine and not at inspection stations.

1. Such sheep, unless accompanied by a satisfactory certificate signed by an inspector of the United States Bureau of Animal Industry, stating that they have been twice dipped in one of the preparations approved by the said Bureau, shall be subjected to a quarantine of thirty days.

2. During such period of quarantine if the inspector has reason to believe, or suspect that they are affected with, or have been exposed to, the infection of sheep scab he may order them to be twice dipped at the expense of the owner or importer at an interval of not less than ten nor more than fifteen days in a dip officially authorized by this Department for such purpose.

3. Sheep imported for immediate slaughter shall be inspected, and, if found healthy, may be permitted to proceed to destination, but all such sheep shall be subject to the direction and supervision of the inspectors of this Department who shall

have full power to deal with them in such manner as will effectually prevent their being brought, prior to slaughter, into direct or indirect contact with any Canadian sheep.

4. Inspectors may, under the authority of this Order, take such steps not inconsistent with the Animal Contagious Diseases Act, or the regulations made thereunder, as may appear to them necessary or advisable in order to prevent the possibility of spreading the infection of sheep scab.

(Signed) A. L. JARVIS,
Acting Deputy Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
OTTAWA, July 20, 1911.

REGULATIONS RELATING TO GLANDERS.

By Order in Council dated 25th March, 1905, as amended May 23rd, 1908, in virtue of "The Animal Contagious Diseases Act, R.S.C., 1906."

1. No animal which is affected with or has been exposed to Glanders shall be permitted to run at large or to come in contact with any animal which is not so affected.

2. Any Veterinary Inspector may declare to be an infected place within the meaning of the "Animal Contagious Diseases Act, R.S.C., 1906," any steamship, or steam or other vessel, or any place or premises where the contagion of Glanders is known or suspected to exist.

3. No horse, mule or ass shall be removed out of an infected place without a license signed by an Inspector.

4. Veterinary Inspectors are hereby authorized to inspect and subject to the mallein test any horses, mules or asses affected with Glanders or suspected of being so affected or which have been in contact with animals so affected or suspected of being so affected, or which have been in any way whatsoever exposed to the contagion or infection of the disease of Glanders, and for the purpose of making such inspection or test to order any such animals to be collected, detained or isolated.

5. Horses, mules or asses affected with Glanders, whether such animals show clinical symptoms of the disease, or react to the mallein test without showing such symptoms, shall on an order signed by a duly appointed Inspector of the Department of Agriculture, be forthwith slaughtered and the carcases disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides.

6. In the event of the owner objecting to the slaughter of animals which react to mallein, but show no clinical symptoms of Glanders, the Inspector may order such animals to be kept in close quarantine and re-tested, such re-tests, however, in no case to exceed two in number and to be completed within twelve months of the first test, provided, however, that owners deciding to have their animals quarantined rather than slaughtered shall forfeit all right to compensation.

7. Horses, mules or asses reacting to the third test with mallein shall be forthwith slaughtered on an order signed by an Inspector and the carcases disposed of as ordered.

8. Inspectors are hereby authorized to permit owners of horses, mules or asses which give no reaction to the third test with mallein and which have at no time shown any clinical symptoms of Glanders, to retain and use such animals subject to the conditions contained in the license signed by the Inspector.

9. Before an order is made for the payment of compensation in any of the cases aforesaid, there must be produced to the Minister of Agriculture a satisfactory report,

order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

10. The certificate of an Inspector to the effect that an animal has reacted to the mallein test or has shown clinical symptoms of Glanders, shall for the purpose of the said Act and of this order be *prima facie* evidence in all Courts of Justice and elsewhere, of the matter certified.

11. Every yard, stable, outhouse or other place or premises, and every wagon, cart, carriage, car or other vehicle, and every utensil or other thing infected with Glanders shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier, in a manner satisfactory to a Veterinary Inspector.

REGULATIONS RELATING TO MALADIE DU COIT.

By Order in Council dated 22nd July, 1911, in virtue of the Animal Contagious Diseases Act, R.S.C., 1906.

1. No animal which is affected, or suspected of being affected with Maladie du Coït shall be permitted to run at large or to come in contact with any animal which is not so affected, and no such animal shall, in any case, be used for breeding purposes.

2. Any inspector may declare to be an infected place within the meaning of "The Animal Contagious Diseases Act," any common, field, stable, or other place or premises where animals are found which are affected or suspected of being affected with Maladie du Coït.

3. No horse, ass or mule shall be removed out of any place so declared to be an infected place without a license signed by an Inspector.

4. The Veterinary Director General may, from time to time, order the slaughter, castration or other disposition of animals affected with Maladie du Coït.

5. Inspectors are hereby authorized to inspect any animals affected with Maladie du Coït, or suspected of being so affected or which have been in contact with animals so affected, or suspected or being so affected, or which have been in any way whatever exposed to the infection of Maladie du Coit, and may order any such animals to be collected, detained, isolated, castrated, or otherwise dealt with as may to them appear advisable.

6. The expenses of, and incidental to the collection of, isolation, seizure, castration, or otherwise dealing with animals for the purposes of these Regulations, shall be borne by the owners of the animals, and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions, except as hereinafter provided.

7. No entire horse, ass or mule nor any ridgling more than one year old shall be permitted to run at large on unfenced lands in the Province of Alberta or in that portion of the Province of Saskatchewan lying west of the third principal meridian.

8. Any entire horse, ass or mule or any ridgling more than one year old found running at large within the area defined above may be seized and held on the order of any duly authorized Veterinary Inspector of the Department of Agriculture, who shall forthwith whenever possible notify the owner of the said animal of such seizure, and the said animal, if not claimed within thirty days of such seizure, may be castrated, and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from said castration, seizure or detention.

9. Animals affected with Maladie du Coït, may on an order signed by a duly appointed Veterinary Inspector acting under special instructions from the Veterinary Director General, be forthwith slaughtered, and the carcases disposed of as in such order provided, and compensation may be paid to the owners of such animals if and when the Act so provides.

10. Before an order is made for the payment of compensation in any of the cases aforesaid there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, and certification of valuation and slaughter, all signed by an Inspector.

REGULATIONS RELATING TO ANTHRAX.

By Order in Council dated 22nd July, 1911, in virtue of the Animal Contagious Diseases Act, R.S.C., 1906.

1. No animal which is affected with or has been exposed to the contagion of Anthrax shall be permitted to run at large or to come in contact with any animal not so affected or exposed.

2. Any inspector may declare to be an infected place within the meaning of the "Animal Contagious Diseases Act" any place or premises where the contagion of Anthrax is known or suspected to exist.

3. No animal nor any portion or product thereof shall be removed out of any place so declared to be an infected place without a license signed by an Inspector.

4. Inspectors are hereby authorized to inspect any animals affected with Anthrax, or suspected of being so affected, or which have been in contact with animals so affected, or suspected of being so affected or which have been in any way whatever exposed to the infection of Anthrax, and may order any such animals to be collected, detained, isolated, or otherwise dealt with as may to them appear advisable.

5. The expenses of, and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purpose of these Regulations shall be borne by the owners of the animals and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions except as hereinafter provided.

6. Where a Veterinary Inspector so orders no animal or animals shall be allowed access to any field, common, yard, stable, or other place or premises where Anthrax exists or has existed.

7. Carcases of animals dying from Anthrax, or suspected Anthrax, must not be skinned, or cut in any way; such carcases together with all litter, excreta and other articles which may have been in contact with them, must be dealt with in accordance with the orders of the Veterinary Inspector and in a manner satisfactory to him.

8. Premises on which animals affected with Anthrax have been kept are to be dealt with at the expense of the owner or occupier, in a manner satisfactory to the Veterinary Inspector.

9. Animals affected with Anthrax or which have been in contact with or in close proximity to animals affected with Anthrax, may, on an order signed by a Veterinary Inspector, duly appointed under the Animal Contagious Diseases Act, be forthwith slaughtered and the carcases disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides, but no Inspector shall order the slaughter of such animals without having first received from the Minister special authority to do so.

10. Before an order is made for the payment of compensation in any of the cases aforesaid there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

11. Any Inspector may declare any steamship, steam or other vessel, railway car or other vehicle, on or in which animals affected with or suspected of being affected with Anthrax, are or have been placed for the purpose of transit, to be infected, and may also declare such vessel, car or other vehicle, to be no longer

infected after it has been thoroughly cleansed and disinfected in accordance with his instructions

12. Every yard, stable, cowshed, outhouse, or other place or premises, and every wagon, cart, carriage, car, or other vehicle, and every utensil or other thing infected or suspected of being infected with Anthrax shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier in a manner satisfactory to an Inspector.

REGULATIONS RELATING TO HOG CHOLERA AND SWINE PLAGUE.

By Order in Council dated 8th June, 1911, in virtue of "The Animal Contagious Diseases Act," R.S.C., 1906.

1. No hog which is or has been affected with, or which has been exposed to hog cholera or swine plague, shall be permitted to run at large, or to come in contact with any hog which is not so affected.

2. Any Inspector may declare to be an infected place, within the meaning of the Animal Contagious Diseases Act, any place or premises where the infection of hog cholera or swine plague is known or suspected to exist.

3. No hog or other animal, nor any portion or product thereof, shall be removed out of a place so declared to be an infected place, without a license signed by an Inspector.

4. Inspectors are hereby authorized to inspect any hogs affected with hog cholera or swine plague, or suspected of being so affected, or which have been in contact with animals so affected or suspected of being so affected, or which have been in any way whatsoever exposed to the contagion of hog cholera or swine plague, and for the purpose of making such inspection may order any such animals to be collected, detained or isolated.

5. The expenses of, and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purpose of these Regulations shall be borne by the owners of the animals, and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions, except as hereinafter provided.

6. Hogs affected with cholera or swine plague, or which have been in contact with or in close proximity to hogs affected with hog cholera or swine plague, shall on an order signed by an Inspector duly appointed under the Animal Contagious Diseases Act be forthwith slaughtered and the carcases disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides.

7. After any place or premises has been declared to be an infected place on account of the existence or suspected existence thereon of hog cholera or swine plague, no hogs shall be brought on to such place or premises, except with the authority of an Inspector, until the said place or premises shall have been declared to have been free from infectious or contagious disease, as provided in Section 20 of the Animal Contagious Diseases Act, and in case of the infraction of this Regulation any compensation to which the owner might otherwise be entitled shall be withheld.

8. Compensation may be withheld in the case of hogs fed on uncooked garbage or kitchen refuse, or on any raw animal flesh or similar food likely to convey the infection of hog cholera or swine plague.

9. Before an order is made for the payment of compensation in any of the cases aforesaid there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

10. Every yard, stable, hog-pen, or other place or premises, and every wagon, cart, carriage or other vehicle, and every utensil or other thing infected or suspected of being infected with hog cholera or swine plague shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier in a manner satisfactory to an Inspector.

REGULATIONS RELATING TO MANGE.

By Order in Council dated 22nd July, 1911, in virtue of the Animal Contagious Diseases Act, R.S.C., 1906.

1. No animal which is affected or has been exposed to the infection of Mange shall be permitted to run at large or to come in contact with any animal not so affected or exposed.

2. Any Inspector may declare to be an infeeted place within the meaning of the "Animal Contagious Diseases Act," any place or premises where the infection of Mange is known or suspected to exist.

3. No animal nor any portion or product thereof shall be removed out of any place so declared to be an infected place without a license signed by an Inspector.

4. Inspectors are hereby authorized to inspect any animals affected with Mange or suspected of being so affected, or which have been in contact with animals so affected, or suspected of being so affected or which have been in any way whatever exposed to the infection of Mange, and may order any such animals to be collected, detained, isolated, dipped, or otherwise dealt with, as may to them appear advisable.

5. The expense of and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purpose of these Regulations shall be borne by the owners of the animals and no indemnity shall be allowed to the owner in case of damage arising out of, or resulting from such actions except as hereinafter provided.

6. Where a Veterinary Inspector so orders, no animal or animals shall be allowed access to any field, common, yard, stable or other place or premises where Mange exists or has existed.

7. Premises on which animals affected with Mange have been kept are to be dealt with at the expense of the owner, in a manner satisfactory to the Veterinary Inspector.

8. Animals affected with Mange or which have been in contact with, or in close proximity to animals affected with Mange, may, on an order signed by a Veterinary Inspector, duly appointed under the "Animal Contagious Diseases Act," be forthwith slaughtered and the carcases disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides, but no Inspector shall order the slaughter of such animals without having first received, from the Minister, special authority to do so.

9. Before an order is made for the payment of compensation in any of the cases aforesaid, there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

10. Any inspector may declare any steamship, steam or other vessel, railway car or other vehicle, on or in which animals affected with or suspected of being affected with Mange are or have been placed for the purpose of transit, to be infected, and may also declare such vessel, car or other vehicle, to be no longer infected after it has been thoroughly cleansed and disinfected in accordance with his instructions.

11. Every yard, stable, cowshed, or other place or premises, and every wagon, cart, carriage, car, or other vehicle, and every utensil or other thing infected or suspected of being infected with Mange shall be thoroughly cleansed and disinfected by, and at the expense of the owner or occupier in a manner satisfactory to an inspector.

SESSIONAL PAPER No. 15b

SPECIAL MANGE ORDER FOR ALBERTA AND SASKATCHEWAN.

By Order in Council dated 8th June, 1911.

Whereas the disease of Mange exists among cattle throughout those portions of the Provinces of Saskatchewan and Alberta which may be described as bounded by the International Boundary, the Rocky Mountains and a line drawn as follows:—

A line from the Rocky Mountains along the northern boundary of the Stoney Indian Reserve to the line between ranges 5 and 6 west of the 5th meridian, thence north along that line to the line between townships 40 and 41, thence east along that line to the 4th principal meridian, thence south along the 4th principal meridian to the Red Deer River, thence along the Red Deer and Saskatchewan rivers to the line between ranges 7 and 8 west of the 3rd meridian, thence south along that line to the International boundary.

Therefore, His Excellency in Council is pleased, in virtue of the provisions of Chapter 75, of the Revised Statutes of Canada, 1906, to order that the annexed regulations relating to Mange in cattle in certain portions of the Provinces of Saskatchewan and Alberta, shall be and the same are hereby established.

REGULATIONS.

CATTLE FOR SHIPMENT OUTSIDE THE AREA FOR PURPOSES OTHER THAN IMMEDIATE SLAUGHTER.

1. Cattle intended for grazing, feeding, breeding purposes or milk production, *or any purposes other than immediate slaughter* shall not be removed or be allowed to move out of the above described tract, nor shall any railway company accept or load any such cattle for shipment, unless they are accompanied by the certificate of a regular salaried Veterinary Inspector of the Department of Agriculture stating that they are free from disease and that they have been, within a period of thirty days immediately preceding the date of shipment, treated under the supervision of a regular salaried Veterinary Inspector and in a manner satisfactory to him, and that they have not, since being so treated, been exposed either directly or indirectly, to the contagion of Mange.

CATTLE FOR IMMEDIATE SLAUGHTER OUTSIDE THE AREA OR FOR EXPORT TO EUROPE.

2. Cattle intended for immediate slaughter or for export to Europe shall not be removed or allowed to move out of the above described tract nor shall any railway company accept or load any such cattle for shipment, except under the following conditions:—

(*a*) Cattle, *other than those consigned to Winnipeg or to points in Canada east of Winnipeg*, shall be removed or allowed to move out of the above described tract, either by rail or otherwise, only when accompanied by the certificate of a Veterinary Inspector of the Department of Agriculture, stating that they have been examined by him and have been found free from infection of Mange and other contagious disease.

(*b*) Cattle, *consigned to Winnipeg or to points in Canada east of Winnipeg*, whether originating within the above described tract or not, shall be inspected at Winnipeg, and no railway company shall release such cattle at Winnipeg, or load such cattle for re-shipment therefrom, until they have been submitted by daylight to a Veterinary Inspector of the Department of Agriculture and certified by him to be free from Mange and other contagious disease.

(*c*) Cattle found on inspection to be affected with Mange or other contagious or infectious disease shall, except as hereinafter provided, be dealt with as may be ordered by the Veterinary Inspector.

INFECTED CATTLE FOR IMMEDIATE SLAUGHTER WITHIN THE AREA.

3. Cattle showing evidence of Mange, originating in a place which has been declared to be an infected place, may be removed therefrom for shipment by rail for slaughter at a given destination within the quarantined area only, in the judgment of a regular salaried Veterinary Inspector who, if he sees fit, may issue a license for such removal, as provided in Section 23 of the Animal Contagious Diseases Act.

4. In the event of any cattle affected with Mange but which have not originated in a place declared to be an infected place being presented for shipment by rail, such cattle, together with any others with which they have been in contact, shall be immediately detained and isolated, or may, if the Veterinary Inspector sees fit, be shipped, under the conditions hereinafter set forth, to a slaughter house within the area properly equipped as hereinafter provided, for immediate slaughter only. The Veterinary Inspector shall immediately report the matter to the nearest regular salaried Veterinary Inspector of the Department who shall thereupon take such further action as may appear to him to be necessary.

5. The loading of the above classes of cattle must be personally supervised by an inspector who must see that the cars conveying them are duly billed to a slaughter house as above provided and that the said cars bear the placard required by Section 7 of this Order.

(*a*) The inspector at the point of shipment shall also notify by telegraph the inspector at the point of destination of the fact that the cattle are being forwarded.

(*b*) Unless loaded through special yards and chutes reserved exclusively for such shipments, all yards and chutes, weigh-scales or other appliances with which they have been in contact shall be declared infected places and shall not again be used until cleansed and disinfected to the satisfaction of an inspector; such cattle shall not be allowed to come in contact with other animals; shall be consigned direct only to such slaughter houses within the hereinbefore described tract as are provided with private yards and chutes; shall not be unloaded at any point en route, and *shall under no pretext whatever, be removed alive from the slaughter house or the yards and premises immediately connected therewith.*

GENERAL PROVISIONS REGARDING SHIPMENT.

6. All waybills and bills of lading accompanying shipments of cattle originating within the said tract, other than those shipped under the provisions of Section 1 of this Order shall have plainly written or stamped across the face thereof a notification that the cars conveying such shipments are to be cleansed and disinfected after being unloaded, and before being again used.

7. All cars conveying such cattle must bear a placard having clearly printed thereon, in letters not less than six inches long, the words "*cattle for immediate slaughter only.*" Such cards shall in no case be removed unless and until the cars have been cleansed and disinfected after being unloaded at final destination.

(*a*) When cattle shipped to United States points are transferred to United States cars, such cars shall also bear a similar placard, but the placards shall not be removed from the Canadian cars unless and until the cars have been cleansed and disinfected under official supervision.

8. At points where cattle originating in the said tract, other than those provided for in Section 1 of this Order, are unloaded they shall be placed in special yards, and such yards shall be used for no other purpose and shall be cleansed and disinfected when so ordered by an inspector.

9. Cars conveying such cattle shall be cleansed and disinfected to the satisfaction of an inspector after being unloaded and before being again used.

10. Cattle shipped for immediate slaughter or for export shall not be sold or otherwise disposed of for any other purpose.

THE TRANSIT OF CATTLE THROUGH THE AREA.

11. The transit of cattle through the said tract is permitted, subject to the following regulations:—

(*a*) Cattle passing by rail through the said tract from one part of Canada to another, shall, at points where unloading is necessary, be placed in yards specially reserved for this purpose, and *shall not be permitted to come either directly or indirectly in contact with cattle which have originated within the said tract,* other than those provided for in Section 1 of this Order.

(*b*) Cattle imported from the United States into the said tract destined for points in Canada outside thereof may, under compliance with the Quarantine Regulations, and with the provisions of the next preceding paragraph hereof, be permitted to pass without unnecessary delay through the said tract direct to their destination without further restrictions.

12. Any infraction of these provisions shall be deemed an infraction of the Animal Contagious Diseases Act and dealt with accordingly.

13. The Minister is hereby empowered to make such alterations in the boundaries of the quarantined area defined by this Order as may from time to time seem to him necessary or advisable.

SPECIAL MANGE ORDER FOR BRITISH COLUMBIA.

By Order in Council dated 8th June, 1911, as amended by Ministerial Order July 5th, 1911.

Whereas the disease of Mange exists among cattle throughout that portion of the Province of British Columbia which may be described as bounded by a line drawn as follows:—

Beginning at the mouth of the North Thompson River, thence north along the said river to the line between townships 22 and 23, thence easterly along the line between townships 22 and 23, to the northwest corner of township 22, range 11, thence south along the line between ranges 11 and 12 to the southern boundary of the railway belt, thence westerly along the southern boundary of the railway belt to the line between ranges 17 and 18, thence northerly along the line between ranges 17 and 18, to the South Thompson River, thence east along the South Thompson River to the place of beginning.

Therefore His Excellency in Council, in virtue of the provisions of Chapter 75 Revised Statutes of Canada, 1906, is pleased to make and establish the following regulations relating to Mange in cattle in certain portions of the Province of British Columbia, and the same are hereby made and established accordingly.

REGULATIONS.

1. Cattle intended for grazing, feeding, breeding purposes or milk production, *or any purpose other than immediate slaughter,* shall not be removed or be allowed to move out of the above described tract, nor shall any railway company accept or load any such cattle for shipment, unless they are accompanied by the certificate of a regular salaried Veterinary Inspector of the Department of Agriculture stating that they are free from disease and that they have been, within a period of thirty days immediately preceding the date of shipment, treated under the supervision of a regular salaried Veterinary Inspector and in a manner satisfactory to him, and that they have not, since being so treated, been exposed either directly or indirectly to the contagion of mange.

2. Cattle *intended for immediate slaughter* shall not be removed or allowed to move out of the above described tract, nor shall any railway company accept or load

any such cattle for shipment, unless they are accompanied by the certificate of a Veterinary Inspector of the Department of Agriculture, stating that they have been examined by him and found free from mange or other contagious disease.

3. The inspector at the point of shipment shall notify by telegraph the inspector at the point of destination of the fact that the cattle are being forwarded.

4. Cattle found on inspection to be *affected with mange* shall not be removed or permitted to move out of the above described tract *under any pretext whatever,* except that by the authority and under the supervision of a Veterinary Inspector of the Department of Agriculture, such cattle may be moved to points within the area *for immediate slaughter.*

5. Such cattle shall not be allowed to come in contact with other animals; shall be consigned direct only to such slaughter houses within the hereinbefore described tract as are provided with private yards and chutes; shall not be unloaded at any point en route, and shall *under no pretext whatever, be removed alive from the slaughter house or the yards and premises immediately connected therewith.*

6. When cattle are shipped for immediate slaughter they shall not be sold or otherwise disposed of for any other purpose.

7. All way-bills and bills-of-lading accompanying shipments of cattle originating within the said tract, other than those shipped under the provisions of Section 1 of this Order, shall have plainly written or stamped across the face thereof a notification that the cars conveying such shipments are to be cleansed and disinfected after being unloaded, and before being again used.

8. All cars conveying such cattle must bear a placard having clearly printed thereon in letters not less than six inches long, the words *"cattle for immediate slaughter only."* Such cards shall in no case be removed unless and until the cars have been cleansed and disinfected after being unloaded at final destination.

9. Unless loaded through special yards and chutes, reserved exclusively for such shipments, all yards and chutes, weigh-scales and other appliances with which they have been in contact shall be declared to be infected places, and shall not again be used until cleansed and disinfected to the satisfaction of an inspector of the Department of Agriculture.

10. Cars conveying such cattle shall be cleansed and disinfected to the satisfaction of an inspector after being unloaded and before being again used.

11. Cattle for transit by rail through the said tract from one part of Canada to another, shall, at points where unloading is necessary, be placed in yards specially reserved for this purpose, and shall not be permitted to come in contact with cattle which have originated within the said tract, other than those provided for in Section 1 of this Order.

12. Any infraction of these provisions shall be deemed an infraction of the Animal Contagious Diseases Act and dealt with accordingly.

13. The Minister is hereby empowered to make such alterations in the boundaries of the quarantined area defined by this Order as may from time to time seem to him necessary or advisable.

SPECIAL ORDER REGARDING THE MOVEMENT OF HORSES IN ALBERTA AND SASKATCHEWAN.

By Order in Council of 19th August, 1911.

Whereas certain contagious diseases exist among horses in those portions of the provinces of Saskatchewan and Alberta which may be described as bounded by the International Boundary, the Rocky Mountains and a line drawn as follows:—

A line from the Rocky Mountains along the northern boundary of the Stoney Indian Reserve to the line between ranges 5 and 6 west of the 5th meridian, thence

north along that line to the line between townships 40 and 41, thence east along that line to the 4th principal meridian, thence south along the 4th principal meridian to the Red Deer river, thence along the Red Deer and Saskatchewan rivers to the line between ranges 7 and 8 west of the 3rd meridian, thence south along that line to the International Boundary.

And whereas it is advisable and in the public interest, with a view to eradicating the disease, that regulations be esablished for this purpose.

Therefore His Excellency in Council is pleased to make and establish the following regulations and the same are hereby made and established accordingly.

REGULATIONS.

1. No horse, except as hereinafter provided, shall be removed or allowed to move out of the said tract unless and until it has been examined by a Veterinary Inspector of the Department of Agriculture and certified to be free from contagious disease.

2. All horses which are intended to be removed or to be allowed to move out of the hereinbefore described tract, except as hereinafter provided, shall be inspected, and if found diseased or to have been in contact with diseased horses shall be dealt with in accordance with the provisions of the Animal Contagious Diseases Act and of the regulations made thereunder.

3. No railway company shall accept or load for shipment from or to any point, either within or without the said tract, any horses which have originated therein unless such horses are accompanied by the certificate of an inspector of the Department of Agriculture, as above provided.

4. All cars and other vehicles used for the carriage of horses originating within the said tract shall be cleansed and disinfected to the satisfaction of an inspector as soon as possible after being unloaded and before being used for any other shipment.

5. All way-bills and bills-of-lading accompanying shipments of horses originating within the said tract shall have plainly written or stamped across the face thereof, a notification that the said cars are to be cleansed and disinfected immediately after being unloaded.

6. The transit of horses through the said tract is hereby permitted subject to the following regulations:—

(*a*) Horses for transit by rail through the said tract from one part of Canada to another, shall, at points where unloading is necessary, be placed in yards reserved for their exclusive use, and *shall not be permitted to come in contact with horses which have originated within the said tract.*

(*b*) Horses imported from the United States into the said tract destined for points in Canada outside thereof, may, upon compliance with the quarantine regulations and with the provisions of the next preceding section hereof, be permitted to pass, without unnecessary delay, through the said tract direct to their destination, without further restrictions.

7. Any infraction of these provisions shall be deemed an infraction of the Animal Contagious Diseases Act and dealt with accordingly.

8. The Minister is hereby empowered to make such alterations in the boundaries of the quarantined area defined by this Order as may from time to time seem to him necessary or advisable.

REGULATIONS RELATING TO SHEEP SCAB.

By Order in Council dated 22nd July, 1911, in virtue of the Animal Contagious Diseases Act, R.S.C., 1906.

1. No sheep which is affected with or has been exposed to the infection of Sheep Scab shall be permitted to run at large or to come in contact with any animal not so affected or exposed.

2. Any inspector may declare to be an infected place within the meaning of the "Animal Contagious Diseases Act" any place or premises where the infection of Sheep Scab is known or suspected to exist.

3. No sheep nor any wool or other portion or product thereof shall be removed out of any place so declared to be an infected place without a license signed by an inspector.

4. Inspectors are hereby authorized to inspect any sheep affected with Sheep Scab, or suspected of being so affected, or which have been in contact with animals so affected, or suspected of being so affected or which have been in any way whatever exposed to the infection of Sheep Scab, and may order any such animals to be collected, detained, isolated, dipped or otherwise dealt with as may to them appear advisable.

5. The expenses of, and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purposes of these Regulations, shall be borne by the owners of the animals and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions except as hereinafter provided.

6. Where a Veterinary Inspector so orders, no sheep shall be allowed access to any field, common, yard, stable, or other place or premises where Sheep Scab exists or has existed.

7. Premises on which animals affected with Sheep Scab have been kept, are to be dealt with at the expense of the owner, or occupier in a manner satisfactory to the Veterinary Inspector.

8. Animals affected with Sheep Scab or which have been in contact with or in close proximity to animals affected with Sheep Scab, may, on an order signed by a Veterinary Inspector, duly appointed under the Animal Contagious Diseases Act, be forthwith slaughtered and the carcases disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides, but no inspector shall order the slaughter of such animals without having first received from the Minister special authority to do so.

9. Before an order is made for the payment of compensation in any of the cases aforesaid there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

10. Any Inspector may declare any steamship, steam, or other vessel, railway car or other vehicle, on or in which animals affected with or suspected of being affected with Sheep Scab, are or have been placed for the purpose of transit, to be infected, and may also declare such vessel, car or other vehicle, to be no longer infected after it has been thoroughly cleansed and disinfected in accordance with his instructions.

11. Every yard, stable, cow shed, outhouse, or other place or premises, and every waggon, cart, carriage, car or other vehicle, and every utensil or other thing infected or suspected of being infected with Sheep Scab shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier in a manner satisfactory to an Inspector.

REGULATIONS RELATING TO RABIES.

By Order in Council dated 10th August, 1905, as amended 28th, May, 1909, in virtue virtue of "The Animal Contagious Diseases Act," R.S.C., 1906.

1. No dog or other animal which is affected with or has been exposed to the infection of Rabies, shall be permitted to run at large, or to come in contact with other animals.

2. Any Veterinary Inspector may declare to be an infected place within the meaning of "The Animal Contagious Diseases Act, R.S.C., 1906," any place or premises where the infection of Rabies is known or suspected to exist.

3. Veterinary Inspectors are hereby authorized to order the slaughter of any dog or other animal affected with Rabies, or suspected of being so affected, and to order the disposition of the carcase of such animal.

4. Veterinary Inspectors are hereby authorized to order dogs or other animals, which have been exposed to the infection of Rabies, to be detained, isolated or muzzled.

5. No dog or other animal, nor any part thereof, shall be removed out of an infected place without a license signed by an Inspector.

6. Every yard, stable, or outhouse, or other place or premises, and every wagon, cart, carriage, car or other vehicle, and every vessel and every utensil or other thing infected or suspected of being infected with Rabies, shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier in a manner satisfactory to a Veterinary Inspector.

7. On receiving the report of an Inspector to the effect that Rabies is known or suspected to exist in any locality, the Minister of Agriculture may order that all dogs, or other animals, within such an area as he may determine or describe, shall be detained, isolated or muzzled in such manner and during such period as he may see fit.

REGULATIONS RELATING TO TUBERCULOSIS.

By Orders in Council dated 23rd December, 1904, and 30th November, 1909, in virtue of "The Animal Contagious Diseases Act, 1903." (R.S.C., 1906).

1. The disease of Tuberculosis is hereby exempted from the operation of Sections 3, 4, 11, 36, 37 and 38 of the "Animal Contagious Diseases Act, 1903" (R.S.C., 1906).

2. Cattle which have re-acted to the tuberculin test shall be deemed to be affected with Tuberculosis, and shall be permanently marked, in such manner as the Veterinary Director General may, from time to time, prescribe.

3. Cattle which have re-acted to the tuberculin test, shall not be permitted to be exported from the Dominion of Canada.

REGULATIONS RELATING TO ACTINOMYCOSIS.

By Orders in Council dated 23rd December, 1904, and 20th March, 1911, in virtue of "The Animal Contagious Diseases Act, 1903" (R.S.C., 1906).

1. The disease of Actinomycosis is hereby exempted from the operation of Sections 3, 4, 11, 36, 37 and 38 of the "Animal Contagious Diseases Act, 1903" (R.S.C., 1906).

2. No animal affected with Actinomycosis shall be exported from the Dominion of Canada.

APPENDIX No. 16.

AN ACT RESPECTING THE INSPECTION OF MEATS AND CANNED FOODS, AS AMENDED MAY 4, 1910.

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as *The Meat and Canned Foods Act.*

2. In this Act, unless the context otherwise requires,—

(*a*) 'carcases' means the carcases of cattle, sheep, swine, goats, game or poultry;

(*b*) 'establishment' means any abattoir, packing house, or other premises in which such animals are slaughtered, or in which any parts thereof or products thereof, or fish, or fruit, or vegetables, are prepared for food for export or are stored for export;

(*c*) 'export' means export out of Canada, or out of any province to any other province thereof;

(*d*) 'food' includes every article used for food or drink by man, and every ingredient intended for mixing with the food or drink of man for any purpose;

(*e*) 'inspector' means an inspector appointed under this Act;

(*f*) 'Minister' means the Minister of Agriculture;

(*g*) 'regulations' means regulations made under the provisions of this Act;

(*h*) 'a farmer' is a person whose recognized occupation is that of farming, and who slaughters only such animals as are fed by him on his own premises.

3. All animals intended for slaughter in any establishment shall be inspected as provided by the regulations.

(2) No animal shall be allowed to enter the parts of an establishment where slaughtering is carried on, unless it has undergone such inspection.

(3) Every animal affected, or suspected of being affected, with contagious or other disease, shall be slaughtered under the supervision of the inspector and be disposed of as provided by the regulations.

4. All carcases and portions thereof of all animals, wherever slaughtered, intended for export, shall be inspected as provided by the regulations.

5. Unless the Minister otherwise directs, upon the report of an inspector, animals owned by farmers and slaughtered by them on their own premises, shall not be subject to inspection under the provisions of this Act.

6. Every carcass, or portion thereof, found to be healthy and fit for food, shall be marked by an inspector in such a manner as is provided by the regulations; and the carcass, or portion thereof, may then be dealt with as the owner thereof sees fit, subject to the further supervision of the inspector.

7. Every carcass or portion or product thereof prepared for food in any establishment and packed in cans or similar receptacles, or in any package whatever, shall be subject to inspection during the whole course of preparation and packing; and after all the requirements of this Act regarding inspection have been complied with, and not until then, all such packages shall be marked by an inspector in such manner as is provided by the regulations.

8. The inspector may at any time re-inspect a carcass, or any portion or product thereof, in order to ascertain whether, subsequently to the first inspection thereof, it has undergone decomposition, or has otherwise deteriorated, or has been tampered with or adulterated by the use of preservatives or otherwise.

(2) Every carcass, or portion or product thereof sent out of an establishment, and returned thereto for any purpose, shall not be again sent out therefrom without re-inspection.

9. Every carcass, or portion or product thereof, found, upon inspection or re-inspection, to be unhealthy or unfit for food, or which contains such ingredients or preservatives as may render it unfit for food, shall be marked by the inspector in such manner as is provided by the regulations, and shall thereupon be deemed to be condemned as unfit for food and shall be disposed of as provided by the regulations.

10. Any person slaughtering, or permitting the slaughtering of, animals and selling, or offering for sale or transportation for food purposes, for export a carcass, or any portion or product thereof, which is unhealthy or unfit for food, is guilty of an indictable offence and liable to one year's imprisonment.

(2) Every one who is convicted of this offence after a previous conviction for the same crime shall be liable to two years' imprisonment.

11. The Governor in Council may, upon application of the owner thereof, exempt any establishment from the operation of the provisions of sections 3 and 4, and of sections 6 to 10, both inclusive, of this Act.

12. All articles prepared for food in any establishment and packed in cans or similar receptacles, or in any package whatever, shall be subject to inspection during the whole course of preparation and packing; and all such packages shall be marked with,—

(*a*) the initials of the Christian names, the full surname, and the address, or, in the case of a firm or corporation, the firm or corporate name and address, of the packer or of the first dealer obtaining them direct from the packer, who sells or offers the said articles for sale; and such dealer shall, upon the request of an inspector appointed under this Act, disclose the name of the packer of such article;

(*b*) a true and correct description of the contents of the package:

Provided, however, that if it be established to the satisfaction of the Governor General in Council that such marking would hinder the sale of any of said articles in foreign markets or in the markets of the United Kingdom, he may exempt such articles from the provisions of this section.

13. All fish, fruit, or vegetables used in any establishment where these articles are prepared for export, shall be sound, wholesome, and fit for food; and any such articles or products thereof found in the said establishment unsound or unwholesome shall be confiscated and destroyed as provided by the regulations.

14. An inspection and close supervision of the sanitary conditions of all establishments shall be maintained, and they shall be conducted under such conditions, sanitary and otherwise, as may be prescribed by the regulations.

2. The inspector shall refuse to inspect or mark articles in any establishment where the sanitary conditions are not in accordance with the regulations.

15. In the event of the provisions of this Act, or any regulations, or the lawful instructions of an inspector not being complied with in any establishment, the Minister may withdraw the inspector therefrom, and may refuse to it the inspection, marking, and certification of the articles prepared therein, and may cause the establishment to be closed.

15*a*. No person shall offer or expose or have in his possession for sale any article subject to inspection under this Act, unless all the requirements thereof respecting the said article have been complied with.

16. No person shall offer or accept for export, or shall export, any articles subject to inspection under this Act, unless its requirements regarding inspection and marking have been complied with in respect to such articles.

Every person offering any carcass, or portion or product thereof, for export, or exporting such carcass, portion or product, shall furnish such proof as is required

by the regulations as to whether the articles so offered for export, or exported, are subject to inspection or not.

(2) No clearance shall be granted to any vessel carrying any carcases, or any portions or products thereof, unless they are duly marked in accordance with the provisions of this Act.

(3) The provisions of this section shall not apply to meats intended for consumption on board the vessels by which they are shipped from a Canadian port.

(4) At the request of the owner of any establishment, the inspector in charge thereof shall issue certificates of inspection for any carcases or portions or products thereof intended for export. Such certificates shall be in such form as is provided by the regulations.

(5) Notwithstanding anything in this section, the Governor in Council may, whenever it is deemed necessary or advisable to do so, authorize the export of any such article without inspection.

17. No article subject to inspection under this Act shall be offered or sold for export, or exported, under any name intended or calculated to deceive as to its true nature.

(2) No package containing any article subject to inspection under this Act shall be marked with any label, brand, or mark which falsely represents the quantity or weight or contents of such package.

(3) No package containing any article subject to inspection under this Act shall be marked with any label, brand, or mark which falsely represents the date when the articles or goods contained therein were packed.

18. Every person who, without authority, wilfully and wrongfully uses or imitates any mark, tag, label or certificate placed on or attached to any article in accordance with the provisions of this Act or of any regulation made thereunder, and every person who wilfully and wrongfully removes, alters, effaces or obliterates, or causes to be removed, altered, effaced or obliterated, wholly or partially, any such mark, tag, label or certificate, shall incur a penalty of one hundred dollars.

19. The Minister may appoint inspectors and other officers for the carrying out of the provisions of this Act, but such appointments shall be confirmed by the Governor in Council within thirty days of the date thereof.

(2) No person shall be appointed as a veterinary inspector until he has passed such examination as is deemed necessary by the Governor in Council.

20. The Governor in Council may make such orders and regulations, not inconsistent with the provisions of this Act, as to him seem necessary for the carrying out of the provisions of this Act.

(2) Such orders and regulations shall have the same force and effect as if embodied in this Act.

(3) Every such order or regulation shall be published twice in *The Canada Gazette*.

(4) Any such order or regulation may be proved by the production of a copy thereof certified by the Minister; and such order or regulation shall, until the contrary is proved, be deemed to have been duly made and issued on the date thereof.

21. The certificate of an inspector or other officer appointed under this Act, or any mark applied under this Act, shall, for the purposes of this Act, be prima facie evidence of the matter which it purports to establish.

22. Any inspector or other officer appointed under this Act may, at any time, for the purpose of carrying into effect any provision of this Act, enter any place or premises, or any steamship, vessel or boat, or any carriage, car, truck, horse-box or other vehicle used for the carriage of articles subject to the provisions of this Act and may require to be produced for inspection, or for the purpose of obtaining copies thereof or extracts therefrom, any books, shipping bills, bills of lading or other

papers, but shall, if required, state in writing the grounds for his action in so doing.

23. Every person who refuses to admit, or who obstructs or impedes, an inspector or other officer acting in execution of this Act, or of any order or regulation made by the Governor in Council or the Minister thereunder, and every person who aids and assists him therein, shall, for every such offence, incur a penalty not exceeding five hundred dollars; and the inspector or other officer may apprehend the offender and take him forthwith before a justice of the peace to be dealt with according to law; but no person so apprehended shall be detained in custody, without the order of the justice, longer than twenty-four hours.

24. Every person who moves, or causes or allows to be moved, any animal, or any article in violation of the provisions of this Act, shall, for every such offence, incur a penalty not exceeding five hundred dollars.

25. The provisions of *The Criminal Code* respecting the bribery and corruption of officials or employees of the Government extend to all inspectors and other persons appointed to carry out the provisions of this Act.

26. Every person who violates any provision of this Act, or of any regulation made by the Governor in Council or by the Minister under the authority of this Act, in respect to which no penalty is hereinbefore provided, shall for every such offence, incur a penalty not exceeding five hundred dollars.

27. Any inspector or constable may, without warrant, apprehend any person found committing an offence against the provisions of this Act, and shall take any person so apprehended forthwith before a justice of the peace to be examined and dealt with according to law; but a person so apprehended shall not be detained in custody, without the order of a justice, longer than twenty-four hours; and any inspector or constable may require that any animal or any article moved in violation of the provisions of this Act be forthwith taken back within the limits of the place whence it was moved, and may enforce and execute such requisition at the expense of the owner of such animal or article.

28. Every offence against this Act, or against any order or regulation of the Governor in Council or of the Minister, shall for the purposes of proceedings under this Act, or of such order or regulation, be deemed to have been committed, and every cause of complaint under this Act, or any such order or regulation, shall be deemed to have arisen, either in the place in which it actually was committed or arose, or in any place in which the person charged or complained against happens to be.

29. Every penalty imposed by this Act shall be recoverable, with costs, before any two justices of the peace, or any magistrate having the powers of two justices of the peace, under Part XV. of *The Criminal Code*.

30. The administration of any part of this Act may be assigned by the Governor in Council to any Minister other than the Minister of Agriculture, and in such case the Minister to whom such assignment is made shall have the same powers with respect to the part of this Act to him assigned as the Minister of Agriculture now has.

REGULATIONS GOVERNING THE INSPECTION OF MEATS.

By Orders in Council, August 1, 1910, and November 12, 1910.

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REGULATIONS GOVERNING THE INSPECTION OF MEATS.—BY ORDERS IN COUNCIL, AUGUST 1, 1910, AND NOVEMBER 12, 1910.

1. In these regulations, unless the context otherwise requires,—

(*a*) 'the Act' means the 'Meat and Canned Foods Act';

(*b*) 'the Minister' means the Minister of Agriculture;

(*c*) 'the Department' means the Department of Agriculture;

(*d*) 'carcases' means the carcases of cattle, swine, sheep, goats, game or poultry;

(*e*) 'establishment' means any abbattoir, packing-house, or other premises in which such animals are slaughtered, or in which any parts thereof or products thereof are perpared for food for export, or are stored for export;

(*f*) 'export' means export out of Canada or out of any province to any other province thereof;

(*g*) 'food' includes every article used for food or drink by man, and every ingredient intended for mixing with the food or drink of man for any purpose;

(*h*) 'inspector' means an inspector appointed under the Act;

(*i*) 'farmer' is a person whose recognized occupation is that of farming and who slaughters only such animals as are fed by him on his own premises;

(*j*) 'regulations' means regulations made under the provisions of the Act;

(*k*) 'portions' means the usual cuts, known as sides, quarters, shoulders, hams, bellies, &c., and also entire organs, such as tongues, livers, hearts, &c.;

(*l*) 'product' means anything prepared from carcases or portions;

(*m*) 'Canada Approved' means that carcases, portions, or edible products so marked have been inspected and found fit for food;

(*n*) 'Rejected' means that carcases or portions so marked may be rendered into lard or tallow;

(*o*) 'Condemned' means that carcases, portions, or products so marked are unfit for food, and shall be destroyed for food purposes;

(*p*) 'Inspection Legend' means the Crown, the words 'Canada Approved,' and the establishment number;

(*q*) 'package' means any can or other container in which carcases, portions, or products are packed, or any box, basket, or other receptacle used for their transportation, or anything in which products are wrapped up or bound together.

2. The following regulations, so far as they affect establishments, shall not apply to any establishment within the meaning of the Act other than those in which animals are slaughtered, or carcases, portions, or products thereof are prepared for food for export, or stored for export.

3. Every animal slaughtered, and all carcases, portions, or products thereof, prepared for food purposes in an establishment, shall be inspected and dealt with as required in these regulations.

4. The Minister may assign to each establishment under inspection a number which, together with the Crown and the words 'Canada Approved,' shall constitute the Inspection Legend for such establishment.

In the case of establishments having one or more branches, tthe Minister may assign to each branch establishment the same number, with the addition of a serial letter.

5. At establishments for which inspection is provided the Minister shall assign an inspector to take charge of the inspection, together with such assistants as he may deem necessary.

Inspectors shall, when in the performance of their duties, wear a numbered badge provided by the Department.

6. Establishments at which inspection is maintained shall furnish suitable accommodations for inspectors, such accommodations to include the exclusive use of a room, or rooms, suitable for office purposes, together with such fittings, sanitary or otherwise, as may be required for the proper conduct of the business of the Department or the accommodation of the inspectors stationed at such establishment.

The inspector in charge shall be kept fully informed by the management of all details regarding the actual operation of the establishment, and such operation will not be permitted under any circumstances without the knowledge of the inspector in charge, and either under his supervision or that of an inspector detailed by him for that purpose.

Every reasonable arrangement must be made as regards hours of work and other details, for the mutual convenience of the management and the officers of the department.

This provision shall have special reference to small establishments situated in the same town, or in close proximity to each other, when two or more are under the supervision of the same inspector.

7. If the following sanitary conditions are not observed, inspectors are authorized to refuse inspection, and to forbid the removal from the establishment of meat and meat food products. Such action shall be reported immediately to the Veterinary Director General:—

(*a*) All establishments having inspection shall be suitably lighted and ventilated. All appliances, such as tables, trucks, vats, machines, containers, &c., must be kept clean and sanitary. All steps in the course of production shall be carried on carefully and with strict cleanliness, and under the supervision of an inspector;

(*b*) Rooms in which carcases, parts, or products thereof are placed or prepared, shall be scraped, scrubbed, whitewashed, or painted at such times and in such manner as may be deemed advisable by the inspector in charge, and shall contain facilities for cleansing all equipment;

(*c*) The yards or pens belonging to or used in connection with any establishment shall be maintained in a clean, comfortable and sanitary condition, and shall not be used for the fattening of swine or other animals, nor shall any offal or other refuse from the establishment be utilized for feeding purposes;

(d) No carcases or parts thereof entering into the production of food shall be allowed to come in contact with anything that will contaminate or deteriorate them;

(*e*) Dressing rooms and lavatory accommodation shall be ample, sanitary and fully equipped, and shall be entirely apart from any room or compartment used for the storing or production of food;

(*f*) Employees of any establishment engaged in handling foods must be free from tuberculosis or other communicable diseases, and must observe such general rules as to sanitation as may be deemed necessary by the inspector in charge;

(*g*) Coverings used by employees to protect their clothing or persons shall be of material easily cleaned;

(*h*) Inspectors in charge of each establishment shall suggest to the manager or owner any needed change in sanitary conditions, and shall report weekly to the Veterinary Director General as to the general observance of this provision.

8. Inspectors must conform to any reasonable rules in force in any establishment in which they may be stationed, such as those prohibiting the use of tobacco on the premises, or other matters of a like nature properly coming under the control of the management. They must refrain from addressing employees except when absolutely necessary, and must at no time detain an employee or engage his attention by unnecessary conversation. Except in case of emergency, all complaints regarding employees, or the manner in which their work is performed, are to be made direct to the management and not to the employees.

Inspectors must constantly keep in mind the fact that the general conduct of the establishment is not in their hands but in that of the management, and that their official duties begin and end with the proper enforcement of the Act and the regulations.

9. Inspectors in charge of establishments shall furnish to the Veterinary Director General such daily and other reports as may be required.

Proprietors of establishments shall, upon request, furnish to the inspector in charge accurate information regarding receipts of stock, shipments and products on hand. They shall also furnish to the Veterinary Director General such information regarding processes of manufacture and other matters of a like nature as may by that officer be deemed reasonable and necessary in the public interest.

10. No animal which has entered the yards or pens of an establishment shall be removed therefrom unless permission in writing is granted by the inspector in charge.

Every animal about to be slaughtered shall be examined by a veterinary inspector in the yards or pens of the establishment prior to entering the killing floor. Establishments shall provide suitable facilities for separating healthy animals from those showing symptoms of or suspected of being affected with disease.

Only such animals as appear on inspection to be healthy shall be slaughtered at the regular kill.

Animals found to be diseased, or suspected of being diseased, shall be tagged in the left ear with a metal tag bearing the word 'Held,' and killed separately at the end of the regular kill.

Animals known as 'cripples' or 'downers' shall be tagged 'Held,' and may be slaughtered at the regular kill or otherwise, upon permission of the inspector in charge.

11. Inspectors shall make a thorough inspection, at the time of slaughter, of the carcass and all portions thereof. If the examination reveals no grounds for detaining or condemning the same, the inspector shall mark such carcass or portions, as required in section 20.

If the inspector deems it necessary to hold any carcass or part thereof for further examination, he shall mark the same 'Held,' as required in section 14.

Should the re-inspection show the carcass or any part thereof to be in any way unfit for food, the inspector shall at the time of reinspection mark such carcass or portion thereof with a 'Condemned' tag, as provided in section 16, and such carcass or portion shall forthwith be placed in the 'Condemned' room or tanked.

Carcases which may be rendered into lard or tallow shall be marked 'Rejected,' but only after all diseased parts have been removed, as provided in section 15.

No part of any carcass shall be removed or so placed as to prevent its ready identification, except with the authority of the inspector.

12. The entire carcass, as also the blood, of any animal affected with any of the following diseases or conditions is to be condemned and tanked, or otherwise disposed of as hereinafter provided:—

Anthrax.
Black Leg.
Pyemia or Septicemia.
Rabies.
Tetanus.
Malignant Catarrh.
Hog Cholera.
Swine Plague.
Texas Fever.
Parasitic ictero hematuria.
Inflammation (chronic or acute) of any of the following tissues: Lungs, pleura, intestines, peritoneum or uterus.

Traumatic Pericarditis.
Jaundice.
Uremia.
Abnormal Sexual Smell.
Parturition (carcases of animals having within ten days given birth to young, if showing any signs of septic infection.)
Immaturity. Every animal under three weeks of age.
Tapeworm Cysts.—Cysticercus Bovis,
Cysticercus Cellulosæ, except when the infestation is slight, in which case the carcass may be rejected and rendered into lard or tallow.
Emaciation or Anæmia.

(2) Tuberculosis.—Any carcass affected with tuberculosis which is emaciated, or in which the disease is generalized or is found in any of the deep-seated lymphatic glands, or in which the lesions wherever situated, are at all extensive, caseous, or purulent shall be condemned.

(*a*) When the lesions are collectively small in extent and calcified, or encysted and confined to the head, or to the head and the thoracic and abdominal viscera and their covering and lymphatic glands, the affected parts shall be removed and condemned (except the head, which shall be removed and may, if the inspector so decides, be rejected after removal and condemnation of the lesions); the remainder of the carcass, if well nourished and, in the judgment of the inspector, otherwise healthy, may be passed;

(*b*) Carcases affected as above, in which the lesions are small but are in a state of caseation, may, if the inspector sees fit, be rejected and rendered into lard or tallow, as provided in section 15 of these regulations, after the diseased portions have been removed and condemned, provided that where the lesions are such as to justify suspicion of extension the inspector shall examine the precrural, prescapular and popliteal glands, in addition to those in, or adjacent to the body cavities, and all carcases in which any of the deep-seated glands are found to be affected shall be condemned.

(3) Actinomycosis and Actinobacillosis. The entire carcass affected with either of these diseases shall be condemned, except when the disease is confined to the seat of primary infection, or is otherwise definitely localized to the satisfaction of the inspector, and the carcass is well nourished and otherwise healthy. Should the head be affected, the whole head, including the tongue, must be condemned. Any other organ in which the disease may be localized, must be condemned.

(4) Carcases or portions showing the following lesions or conditions shall be condemned:—

Abscesses.
Bruises.
Tumours.
Internal parasitic infection.

(5) Any abnormal condition not herein described must be dealt with as the judgment of the inspector directs.

(6) The presence at any establishment of an animal affected with or showing symptoms of any contagious or infectious disease, must be promptly reported to the Veterinary Director General by the inspector in charge, who shall also take immediate steps to ascertain the point of origin and address of former owner, and the place whence such animal was shipped, at the same time taking such further action under the provisions of the 'Animal Contagious Diseases Act' as he may deem necessary and advisable.

(7) Animals in an advanced stage of pregnancy shall be tagged 'Held.' They shall not be slaughtered at that time nor for ten days after parturition, but may be

removed for stock or dairy purposes, provided they are not affected with and have not been exposed to infectious or contagious disease. Before such animals are released, permission in writing shall be granted by the inspector in charge, and the 'Held' tag removed.

13. In every establishment there shall be set apart special rooms or compartments, one to be known as the 'Detention' room, in which all carcases, portions or products thereof, marked 'Held,' shall be placed until finally inspected or dealt with. The other room shall be known as the 'Condemned' room, in which shall be placed all carcases, portions or products thereof, marked 'Condemned.' Both rooms shall be well lighted, and so constructed and situated that they may be easily cleaned and disinfected. The doors shall be so fitted that they may be locked, with locks supplied by the Department, and the inspector shall retain charge of such locks and their keys.

If, after final inspection in the detention room of any carcass or portion marked 'Held,' the same is found fit for food, the 'Held' tag shall be removed, and the carcass, or portion, stamped as required in section 20. Any carcass or portion marked 'Held,' and which on final inspection is found to be unfit for food, shall be marked as provided in these regulations, and removed at once to the 'Condemned' room.

14. If at any time an inspector deems it necessaray to further inspect any carcass, portion or product, he shall firmly attach thereto a white paper tag, numbered, and having thereon the word 'Held,' and immediately have the carcass, portion or product so marked placed in the 'Detention' room. In all cases where the inspector making the first examination is not the same individual as the one making the final inspection, the former shall furnish to the latter a description of the animal or article, and the reason for which it was held, together with the number of the 'Held' tag. If, on final inspection or other investigation, the carcass, portion, or product is found fit for food, the 'Held' tag shall be removed and the carcass, portion, or product marked with the Inspection Legend . Should inspection show the same to be unfit for food, it shall be immediately marked as provided, and removed to the 'Condemned' room for final disposition.

Carcases showing diseased or injured portions which cannot be readily removed at the time of slaughter, shall be marked 'Held,' and placed in the detention room until chilled, when the inspector may, if he sees fit, remove the affected portion and mark it 'Condemned,' and the remainder of the carcass 'Rejected' or 'Canada Approved' as he may decide.

15. Each carcass, or portion thereof, found on inspection or re-inspection, to be unfit for ordinary food purposes, but not unfit to permit of its being rendered into lard or tallow, shall be marked with a numbered red paper tag having thereon the word 'Rejected.'

All carcases or portions marked 'Rejected' must be cooked by steam at a temperature not lower than 220° F., for not less than four hours.

16. Upon each carcass, portion or product thereof, found on inspection, re-inspection, or during the process of production, to be in any way unfit for food, there shall be placed a black paper tag bearing a number and the word 'Condemned,' and such carcases, portions, or products shall be immediately placed in the 'Condemned' room, or tanked as provided for in the following section.

All animals found dead, or in dying condition, upon the premises of any establishment, shall be tagged in the right ear, by an inspector, with a metal tag bearing a number and the word 'Condemned.'

Such tag shall under no circumstances be removed, except by the inspector supervising the final disposition of the carcass, portion, or product so marked, who shall report as to its disposition.

17. Every establishment having inspection shall be equipped with facilities satisfactory to the Minister for the tanking of all diseased carcases, portions, or products. They must be so placed or operated as to cause no odours or fumes to pervade any room wherein carcases or portions thereof are prepared or stored for food purposes.

All carcases, portions, or products which have been marked 'Condemned,' shall be tanked or otherwise disposed of as hereinafter provided, under the supervision of an inspector. Tanks shall be entirely separate and detached from any pipe or conduit leading to or from any tank, pipe, or conduit in which edible products are prepared, conveyed or stored, and shall be sealed, and the seals broken only by an inspector, who shall see that the process of tanking is sufficiently thorough to render impossible the utilization of any of the condemned carcases, parts, or products in any way for human food.

As a further precaution, with the above object in view, the Minister may authorize the use by inspectors of any colouring or other matter which may be considered suitable.

Establishments which, on being first brought under inspection, do not possess the necessary equipment for tanking, will be granted reasonable time in which to provide the same. Until then, inspectors will slash carcases, or portions thereof, in such a way as to render them unsaleable and easily identified, and will, in addition, be required to supervise their burning or proper burial.

Notwithstanding anything in this section, inspectors in charge shall at all times have the right, either for official or for scientific or educational purposes, to reserve any carcass, or any portion or product thereof, which has been condemned on account of disease or other abnormal condition, as also to retain, for any of the above purposes, specimens from any carcass, portion, or product which has been rejected.

Any inspector reserving any carcass, or any portion or product thereof, as above provided, must immediately report his action in so doing to the Veterinary Director General.

18. No carcases or portions thereof, other than those bearing the Inspection Legend and which have been inspected and found fit for food, shall be allowed to enter any establishment at which inspection is maintained, except as hereinafter provided:—

(*a*) Carcases, portions, or products thereof shipped from foreign countries, if properly certified, whether by marking or otherwise, to have passed government inspection to the satisfaction of the Minister before leaving the country of origin; but such carcases, portions, or products shall be re-inspected and dealt with accordingly;

(*b*) Dressed carcases which, except in the case of game or poultry, must have the head, heart, lungs and liver held by their natural attachments; such carcases to be inspected before entering the establishment, and, if found fit for food to be marked with the Inspection Legend; if found to be diseased, or otherwise unfit for food, to be dealt with as provided in the regulations;

(*c*) Unmarked carcases or portions, shipped from another establishment at which inspection is maintained, under the provisions of section 26 of these regulations;

(*d*) Manufactured sausage casings if, upon inspection, they are found to be healthy and fit for human food;

(*e*) Carcases of sheep or lambs of any age, or of dressed calves not more than three months old, from which the head has been removed, provided that the heart, lungs and liver are held by their natural attachments;

(f) Carcases, portions, or products which do not come within the classes already mentioned in this section, shall be permitted entrance to an establishment only in accordance with such special directions or instructions as may be issued by the Minister, but shall in no case be received unless the inspector in charge has been notified;

(*g*) Carcases, portions, or products thereof shall be permitted to enter establishments only through such doors, passages, or other means of entrance as are designated for that purpose, and at such times and under such conditions as may be approved by the inspector.

19. Inspectors may at any time re-inspect any carcass, portion, or product thereof which has been prepared, stored in, or returned to any establishment, or is about to

be shipped therefrom. If upon such re-inspection any carcass, portion, or product is found to be unfit for food, by reason of adulteration or deterioration, or any other cause, it shall be dealt with and disposed of as provided in these regulations.

20. Except when shipped direct to an establishment under inspection, as provided in section 26, every carcass, portion, or product found, upon inspection or re-inspection, to be fit for food, which is to leave the establishment, shall have a stamp or mark showing the Inspection Legend. In the case of such portions or products as cannot be individually marked, the marking shall be placed on the case, package, or container, in such manner as is prescribed in section 25 of these regulations.

21. Sausages, canned meats, and portions intended for cure, shall be prepared only from carcases or portions which have been marked with the Inspection Legend, or which have been admitted to an establishment in accordance with these regulations, and which on reinspection are found fit for food. Their preparation and packing shall be supervised by an inspector, who shall not allow any fixture, appliance, or receptacle to be used in the production of food products unless the same is clean and sanitary.

No food product shall contain and deleterious substance, drug, dye or preservative.

With the object of preventing the use of deleterious substances, the inspector shall, as often as deemed advisable, procure samples of the preservatives used, as also of the different food products during their preparation, or after they have been prepared, and shall submit them without delay to the department for analysis.

Inspectors in charge will be furnished by the department with the names of harmless preservatives and dyes which may be used; the addition of others will prevent the approval of the product.

22. The proprietor or manager of any establishment shall, upon request of the inspector in charge, furnish to him free of charge any sample or samples of preservatives, food products, or any ingredient used in the preparation of foods. Samples so obtained must be sealed, labelled and marked with a description of the same, together with the inspector's name, and the date, and forwarded at once to the Veterinary Director General.

23. All carcases, portions, or products of carcases, prepared for food and packed in cans or similar receptacles, or in any package, shall be subject to inspection during the whole course of preparation and packing; and all such cans or receptacles shall be marked, unless otherwise ordered by the Governor in Council, with:—

(*a*) The initials of the Christian names, the full surname and the address, or, in the case of a firm or corporation, the firm or corporate name and address, of the packer, or of the first dealer obtaining them direct from the packer who sells or offers the said articles for sale; and such dealer shall, upon the request of an inspector appointed under the Act, disclose the name of the packer of such article.

(*b*) A true and correct description of the contents of the package.

These requirements shall be embodied on a trade label, stencil, or lithographed design, which shall be of a size reasonably proportionate to the size of the package, duly approved by the Minister, having thereon the Inspection Legend in addition to the name and address of the packer or of the first dealer, as provided above, and description of the contents. All letters and figures in the Inspection Legend shall be of a size reasonably proportionate to the general lettering of the label, stencil, or lithographed design.

No can, receptacle, or package subject to inspection shall be marked with anything which falsely represents the quantity, weight, contents, or date when contents of same were packed.

Owners or managers of establishments shall supply to the Veterinary Director General, for fyling purposes, a copy of every label, stencil, or lithographed design used in the establishment.

24. All labels, cans, receptacles, or containers, upon which the name and address of the packer, or first dealer, and the Inspection Legend are stencilled, or otherwise embodied in a permanent manner, shall be under the custody of an inspector.

25. When carcases, portions or products are shipped from any establishment in any package, case, or covering concealing wholly or partially the contents, the package, case or covering shall be marked in accordance with the requirements of section 23 of these regulations, unless such shipment is being forwarded direct to an establishment under inspection, as provided in section 26, and is covered by a certificate issued by an inspector of the department.

Owners or managers of establishments shall supply all necessary help to affix labels and stamps under the supervision of an inspector.

26. Carcases, portions, or products, intended for food purposes, may be permitted to leave an establishment under inspection without having been marked as provided in section 20 of these regulations only when such carcases, portions, or products are consigned direct to another establishment under inspection. Every such shipment must be accompanied by a certificate from the inspector in charge of the establishment of origin, which certificate shall set forth fully the number and nature of the carcases, portions, or products which it purports to cover, as also the name of the consignee. This certificate shall be made out in triplicate, the original and duplicate to be handed to the common carrier, if any, accepting the shipment, the original to be fyled and the duplicate forwarded to the Veterinary Director General, by the common carrier; in the case of shipments conveyed by wagon or other vehicle from one establishment to another establishment under inspection, the original shall be fyled by the inspector in charge of the establishment forwarding the shipment and the duplicate forwarded by him to the Veterinary Director General. The triplicate in each case shall be sent by the inspector in charge of the establishment in which the shipment originated to the inspector in charge of that to which the consignment was made.

In the case of carload shipments, the certificate shall also show the car number and initials.

All cars, wagons, or other containers used for the conveyance of unmarked meats, as above provided, must be sealed by an inspector in the establishment of origin, and such seals shall be broken only by an inspector.

27. Except as provided in section 37 of these regulations, no clearance shall be granted to any vessel carrying any carcases, portions, or products thereof, other than ship stores, out of the Dominion, unless said carcases, portions, or products have been duly marked with the Inspection Legend.

As evidence that this requirement and the provisions of the Act have been complied with, it shall be deemed sufficient if a certificate signed by the inspector in charge of the establishment in which the shipment originated, or by the shipper, has been fyled with the Customs authorities by the master, owner, or agent of the vessel, to the effect that the carcases, portions, or products have been duly inspected and marked according to the provisions of the Act; such certificate to set forth also the number of carcases, portions, or packages, weight, description, shipping marks, shipper, consignee and destination.

On request of the owner of an establishment, the inspector in charge shall issue a certificate in triplicate covering any carcases, portions, or products thereof, which have been inspected and marked with the Inspection Legend, and which are to be exported out of the Dominion. Such certificates shall be issued in serial numbers. The original, duplicate and triplicate shall be given to the shipper, who shall hand them to the transportation company; the original to be attached to the bill of lading accompanying the shipment for the information of the Customs authorities; the duplicate kept on fyle by the transportation company accepting the shipment; and

the triplicate forwarded by the transportation company to the Veterinary Director General.

28. When any carcass, portion or product thereof, is offered for transportation, for export, the person, firm, or corporation shipping the same shall fill out a certificate in duplicate in one of the following described forms (unless the shipment is covered by a certificate signed by an inspector, as provided for in sections 26 and 27), which shall be delivered to the common carrier or other person to whom such shipment is offered; and no common carrier or other person shall transport or accept for transportation for export any carcass, portion or product thereof until such certificate in duplicate has been duly made and signed by the shipper or an inspector.

(1) To be used when shipment consists of duly inspected and marked carcases, or parts or edible products thereof:—

Station.....Date.....

Name and address of shipper.....
Name and address of consignee.....
Name of carrier.....

I hereby certify that the following described shipment consists of carcases, parts, of products thereof, which have been duly inspected and marked with the Inspection Legend according to the 'Meat and Canned Foods Act,' and that the articles comprising it have not been tampered with or treated, since they were so marked, in any way other than is allowed by the said Act or the regulations made thereunder, and that they are at this date wholesome and fit for human food.

No. of packages.....
Weight .....
Description .....
Shipping marks .....
.....

Signature of Shipper.

(2) To be used when shipment is made by a farmer:—

Station.....Date.....

Name and address of shipper.....
Name and address of consignee.....
Name of carrier.....

I hereby certify that I am a farmer, and that the following described carcases or parts thereof are from animals owned by me and slaughtered upon my own premises, and that they are at this date wholesome and fit for human food.

No. of carcases or parts.....
Description .....
.....

Signature of Shipper.

(3) To be used when the shipment is of foreign origin, and consists of inspected and marked carcases, portions, or products thereof, which have passed a government inspection in the country of origin satisfactory to the Minister.

Station.....Date.....

Name and address of shipper.....
Name and address of consignee.....
Name of carrier.....

I hereby certify that the following described shipment consists of carcases, parts or products thereof which have been duly inspected in.....

(Country of origin)

and are marked.....

(Markings)

which is the official export marking of that country, certifying that they have passed government inspection, and that they are at this date, to the best of my knowledge and belief, sound, wholesome and fit for human food.

No. of packages.....
Weight.....
Description.....
Shipping marks.....

.....

Signature of Shipper.

29. All certificates, other than those issued by inspectors, as provided for in sections 26 and 27, shall be made in duplicate; the original shall be filed by the initial carrier and kept on file for at least one year, and the duplicate shall be immediately forwarded by him to the Veterinary Director General.

30. Way-bills, transfer bills, running slips, or conductor's cards, accompanying any shipment of carcases, portions, or products thereof, shall have stamped thereon, or attached thereto, the following certificate:—

(*a*) In case of duly inspected and marked carcases, parts, or edible products:—

'Shipment inspected and marked "Canada Approved," as evidenced by shipper's certificate on file with initial carrier.'

Railroad Company.....

.....

Agent.

(*b*) In case of shipments made by farmers:—

'Uninspected, as evidenced by shipper's certificate on file with initial carrier.'

Railroad company.....

.....

Agent.

(*c*) In case of shipments of foreign origin:—

Shipment inspected and marked in.....

(Country of origin.)

as evidenced by shipper's certificate on file with initial carrier.'

Railroad company.....

.....

Agent.

(*d*) In case of shipments Inspected but not marked:—

'Shipment inspected but unmarked, as evidenced by inspector's certificate on file with initial carrier.'

Railroad company.....

.....

Agent.

31. Nothing in sections 27 or 28 shall apply to sausage casings, carcases or portions of game or dressed poultry, or to pork and beans, or to mincemeat, which may, unless otherwise ordered, be accepted for transportation, for export, without certification or marking.

32. Notwithstanding anything in these regulations, common carriers may accept, for export, without certification, any animal product not intended for food purposes, provided that each package, cask, or other container is plainly and permanently marked with the following words: 'Inedible. Unfit for food.' Such marking must be distinct and in letters not less than one inch in length.

33. The presence of the Inspection Legend on any carcass, portion, or product thereof shall indicate only that the article so marked was at the time of marking sound, healthy and fit for food, and that, in the case of products, the process of manufacture was conducted under proper sanitary conditions.

34. The words 'Canada Approved' and the Crown, with or without any establishment number, are hereby declared to be a government mark.

35. No person, not being an inspector duly appointed under the Act, or duly authorized by an inspector so appointed, shall apply the Inspection Legend, or the words 'Canada Approved,' or any word or words of like meaning or effect, to any

carcass, portion or product thereof, or to any article of food, or to any package containing the same.

36. After the contents of any package or covering bearing the Inspection Legend have been removed, no further use of the Legend shall be made, but it shall forthwith be destroyed.

37. The provisions of these regulations with regard to export shall not apply to the shipment of carcases, portions, or products from any one of the three provinces of Nova Scotia, New Brunswick and Prince Edward Island to any other of the said three provinces, or to Newfoundland, St. Pierre et Miquelon, or the Magdalen Islands.

38. Collectors of Customs throughout Canada shall see that the various exigencies and requirements of these regulations, or any ministerial or other order made thereunder, are fulfilled before granting any permit which requires, before it is given, any act to be performed or any inspection or other proceeding to be made or taken and they shall see that the prohibitions prescribed and rules established by these regulations as hereinbefore mentioned, and the instructions which may be issued by the Minister, are obeyed, and, in case of any infraction of the provisions of these regulations, or any of them, taking place, they shall report at once to the Minister the nature and extent of such infraction.

REGULATIONS GOVERNING THE INSPECTION OF PRESERVED FRUITS, VEGETABLES AND MILK.

(By Order in Council, July 6th, 1910.)

1. In these regulations, unless the context otherwise requires,—

(*a*) 'The Act' means the Meat and Canned Foods Act;

(*b*) 'The Minister' means the Minister of Agriculture;

(*c*) 'The Department' means the Department of Agriculture;

(*d*) 'establishment' means any factory, cannery, evaporating plant, or other place or premises in which fruits, vegetables, or fruit or vegetable products are processed, canned, bottled, evaporated, dried, or otherwise preserved for food for export, or in which milk is condensed, evaporated, or otherwise preserved for food for export, or in which any of the articles aforementioned are stored for export;

(*e*) 'export' means export out of Canada, or out of any province to any other province thereof;

(*f*) 'food' includes every article used for food or drink by man, and every ingredient intended for mixing with the food or drink of man for any purpose;

(*g*) 'inspector' means an inspector appointed under the Act;

(*h*) 'regulations' means these regulations made under the provisions of the Act;

(*i*) 'products' means anything prepared from fruit or vegetables, or any condensed or evaporated milk;

(*j*) 'container' means any receptacle made of wood, glass, earthenware, or metallic substance, whether hermetically sealed or intended to be so sealed, or otherwise;

(*k*) 'package' means any can or other container in which products are packed, or any box, basket, or other receptacle used for their transportation, or anything in which products are wrapped up or bound together.

2. These regulations shall apply to all establishments within the meaning of paragraph (*d*) of section 1 hereof.

3. The Minister may, as provided in the Act, appoint inspectors who shall, from time to time, visit each establishment for the purpose of seeing that the provisions of the Act and of these regulations are duly observed and complied with.

4. Inspectors shall, in the performance of their official duties, wear a numbered badge provided by the department.

5. Inspectors shall furnish to the Veterinary Director General full and detailed reports of all inspections made by them, and of such other matters as may, in the public interest, be deemed necessary or advisable.

6. The following sanitary conditions shall be observed and maintained in all establishments:—

(*a*) All establishments shall be suitably lighted and ventilated;

(*b*) All appliances, such as tables, trucks, vats, machines, kettles, containers, &c., shall be kept clean and sanitary;

(*c*) All operations in connection with the preparation or packing of products shall be carried on carefully, and with strict cleanliness;

(*d*) Rooms in which articles intended for food are stored, processed, or otherwise prepared, shall be scraped, scrubbed, whitewashed, painted, or otherwise dealt with at such times as may be deemed necessary by an inspector, and shall contain facilities for cleaning all equipment;

(*e*) Employees of any establishment engaged in handling articles intended for food must be free from tuberculosis or other communicable disease, and must observe such general sanitary rules as may be deemed necessary by the inspector;

(*f*) No articles entering into the production of food shall be allowed to come in contact with anything that will contaminate or deteriorate them;

(*g*) Coverings used by employees to protect their clothing or persons shall be of material easily cleaned, and shall be kept reasonably clean;

(*h*) Dressing rooms and lavatory accommodations shall be ample, sanitary and fully equipped, and shall be entirely apart from any room or compartment used for the storing or production of food or of articles intended for food;

(*i*) All yards, outhouses, or other premises belonging to or used in connection with any establishment shall be maintained in a clean and sanitary condition, and shall not be used for the emptying or storing of refuse;

(*j*) The drainage, if any, in connection with establishments shall be ample, and kept in proper working order;

(*k*) No lavatory, sink, or cesspool shall be so situated or maintained as to permit any odours or fumes therefrom to pervade any room where food or articles intended for food are prepared or stored.

7. All fruits, vegetables, milk, or other articles used in any establishment shall be sound, wholesome, and in every way fit for food.

8. All fruits, vegetables, milk, or other articles intended to be used for food, found by an inspector in any establishment, whether in course of preparation or after they have been prepared, to be decomposed, diseased, or in any way unfit for food purposes, shall be confiscated by the inspector and destroyed under his supervision.

9. No food or food product shall contain any deleterious drug, dye, or preservative, or other foreign substance injurious to health.

(2) Pending the issue by the Inland Revenue Department of its regulations relating to Food Standards, no drug, dye, preservative, or seasoning which has not been approved in writing by the Veterinary Director General, shall be used in the preparation or packing of any food product.

(3) Proprietors of establishments will be furnished by the Veterinary Director General with a list of approved dyes, drugs and preservatives. Any proprietor of an establishment may also submit to the Veterinary Director General for his approval any dye, drug, preservative, or seasoning which he may desire to use, and in the event of any such preparation being approved, its use shall be permitted.

10. With the object of preventing the use of deleterious substances, inspectors shall, as often as deemed advisable, procure samples of the preservatives used, as also of the different food products during their preparation, or after the same have

been prepared, and shall submit them without delay to the Veterinary Director General.

The proprietor of any establishment shall, upon request of an inspector, furnish to him free of charge any sample or samples of foods or food products, or of any preservative, seasoning, or other ingredient used in the preparation of foods. Samples so obtained must be sealed, labelled and marked with a description of the same, together with the inspector's name and the date, and forwarded at once to the Veterinary Director General.

11. Containers in which vegetables, milk, or other articles intended for food are finally placed, shall be clean and sanitary, and, if previously used, must be thoroughly sterilized immediately prior to being filled.

12. Containers or packages in which fruits, vegetables, milk, or other articles prepared for food in any establishment are placed shall be marked, unless otherwise ordered by the Governor in Council, with:—

(*a*) The initials of the Christian names, the full surname, and the address, or, in the case of a firm or corporation, the firm or corporate name and address of the packer, or of the first dealer obtaining it direct from the packer who sells or offers the same for sale. Such dealer shall, upon the request of the inspector appointed under this Act, disclose the name of the packer of such articles;

(*b*) A true and correct description of the contents of the package.

These requirements shall be embodied upon a trade label, stencil, or lithographed design, which shall be of a size reasonably proportionate to the size of the container or package, having thereon, as provided above, the name and address of the packer or of the first dealer, and a true and correct description of the contents.

13. No container or package shall bear any label or mark of any kind which falsely represents the nature or quantity or weight of its contents, or the date when such contents were packed.

14. No person shall offer for export or shall export any fruits or vegetables, or fruit or vegetable products, canned, bottled, evaporated, dried, or otherwise preserved for food, or any milk, condensed, evaporated, or otherwise preserved for food, in any establishment, unless the requirements of section 12 of these regulations as regards labelling have been complied with in respect to such articles.

APPENDIX No. 17.

OTTAWA, May 1st, 1911.

SIR,—I have the honour to present herewith a series of short articles on Horse Breeding and the Care of Mares and Colts, which I have prepared in the hope that they may be of some value to farmers interested in this particular branch of animal industry.

I would recommend that these should be printed in bulletin form for general distribution.

I have the honour to be, Sir,

Your obedient servant,

J. G. RUTHERFORD,
Veterinary Director General and Live Stock Commissioner.

To the Honourable
The Minister of Agriculture,
Ottawa.

THE BREEDING OF HORSES.

It is an old and true saying, never truer than it is to-day, that "there is always room at the top": and this applies, not only to the human race, but to all the various species of domestic animals. Thus while the individual who breeds and raises scrub stock may, and doubtless often does, find considerable difficulty in disposing of his surplus, the man who successfully devotes his attention to the production of a first-class animal is seldom found complaining for want of a customer. While this is true of all kinds of stock, it is for obvious reasons especially the case with regard to the horse; for while the beef from a scrub steer, the mutton from a scrub wether,, the pork from a scrub hog, or the butter from a scrub cow, while not so remunerative as similar products from specially adapted animals, will, if of fair quality, generally find a purchaser, the scrub horse is always a drug in the market, and is sure to be less and less demand as time passes and public taste in this respect becomes more fastidious on the other hand, the good horse was never in greater request than he is to-day. All over the civilized world the prices paid for the good horse of any distinct class are on the rise, and the man who has him or can breed him is sure of his market and his money. This being the case—and that it is so, is capable of easy demonstration—it behooves us to do our best to find out how to obtain him.

Every man who owns a mare, ought, before stinting her, to draw a mental picture of the horse he wants to get from her, and in doing so must not, of course, lose sight of the mare herself, nor of the influence which she must, of necessity, wield in bringing his projects to fruition. Her size, shape, make and breeding must all be considered and carefully weighed before the sire of the future prodigy is selected, while he must be chosen with the view of perpetuating the good points and overcoming the deficiencies of the dam. The great initial law of breeding is that of "Heredity", or "like produces like"; and while, as will be shortly shown, there are many and frequent deviations therefrom, capable more or less of being guarded against, this is the sheet-anchor of the breeder, the basis of his calculations, and must be acted upon in all cases, except where some individual idiosyncrasy has been incontestably proved to exist. This principle of "like producing like" is so generally recognized that it is scarcely necessary to dwell upon it, except perhaps, to call attention to the little but

salient fact, liable in horse breeding to be, by the beginner, overlooked, viz., that like really only produces like from like, or in other words, that in order to obtain a perfect production of the original type, both sire and dam must be of the same type, and also of the same type as to ancestry. In cases where this similarity of type does not exist, however, and where one parent has a preponderance of line breeding, the prepotency thus acquired will stamp the progeny with his or her characteristics in a marked degree. The transmissability of disease, or of that tendency towards disease known as hereditary diathesis, frequently appears to evade this last clause of the law, as no amount of sound line breeding or individual soundness on one side seems to avail in preventing the perputation of congenital faults through the other parent, even when the latter is of very inferior pedigree. Apart from the question of disease, however, it may be accepted as a general rule that the straighter the pedigree of an animal the greater will be the prepotency exhibited in marking the progeny.

In-breeding, though by no means to be commended, was a great factor in the earlier days of scientific breeding in conferring the power of perpetuating a distinct type upon various families of both horses and cattle, although in such cases I have always been of the opinion that it partakes to some extent of the nature of the next phase of our subject with which we have to deal, viz., "Atavism" or "reversion," better known, perhaps, as "breeding back." "Throwing back," the bug-bear of the cross-breeder, has never been fully explained, although the researches and discoveries of Mendel have, of recent years, thrown a flood of light upon the subject. It is undoubtedly due to dominant ancestral influence but without a thorough and complete knowledge of the lineage direct and collateral of both sire and dam, it is, in most cases, practically impossible to account for its occurrence in line bred stock. Many apparent freaks and sports of nature are due to Atavism and it is the strongest possible argument in favour of pure bred sires and dams, as, in the case of such animals, the reversion, when it does occur, is to an ancestor of the same type of, perhaps, as good individual quality as the more immediate progenitor, while in breeding from mongrels the chances are all the other way. In short-pedigreed stock also the tendency to throw back is very much stronger, owing to lack of the prepotency conferred by a long line of ancestors of similar type. This is very clearly shown in breeding to the so-called general purpose and agricultural stallions, many of them remarkably fine individuals, but seldom, even when bred to equally fine mares of similar short breeding, getting colts at all equal in any particular to either the sire or the dam, who doubtless obtained their excellence from one or more crosses with pure-bred stock. The stinting of cross-bred mares to cross-bred sires is, for this reason, the most rapid and effectual mode of deteriorating horse-flesh yet discovered, as the large number of shapeless, unsalable plugs which disgrace this continent amply demonstrates. What intelligent breeder wishing to improve his herd of cattle, would use a grade bull, and yet what better right to public patronage has the grade stallion?

Climate is also responsible for many variations from the law of heredity; although, inasmuch as the change is more gradual and not much noticed in one generation, it does not attract the same attention as the more striking phenomenon of reversion. One finds, nevertheless, in almost every country, that the original or native horse has adapted himself to the conditions, geographical or topographical, peculiar to his surroundings. The Arab, at home in the sandy desert, wiry and spare as the scanty herbage which forms its food; the Icelandic pony, with his rough bone and wool-like fleece; the flint-footed, deer-legged, mountain ponies of Scotland and Wales; the ponderous wide-soled draught horses of the Low Countries; the active mustang of South and Central America, the hardy French-Canadian and the much-enduring Shagginappi are all living proofs of Dame Nature's wonderful power of adapting herself to circumstances.

Variation from the type anticipated is also occasionally brought about in a way but seldom taken into consideration, viz.; through the nervous impression produced on a female at the first service, stamping her subsequent progeny in a greater or less

degree with the characteristics of her first mate. This phenomenon, termed scientifically Telegony, is, as most dog-fanciers know, frequently observed in the bitch, being, of course, more noticeable, owing to the remarkable divergence of canine types; but it is also, recent pronouncements to the contrary notwithstanding, patent to the close observer of horses. Frequently, in the Middle States, I have noticed horses which, at a short distance, strongly resembled mules, and, upon inquiry, have invariably found such animals to be the progeny of mares which had first been used in breeding that useful but unpretentious hybrid. Though too generally entirely disregarded, the possible occurrence of this form of variation should be taken into consideration by the careful and ambitious breeder, especially when a pure type is sought to be attained.

Variation may be due to extrinsic causes, as when monstrosities are borne by females injured or frightened during pregnancy, causing violent nervous shock; or in a less marked form by an impression produced upon the imagination of the dam by some unusual sight not necessarily of a frightful or terrifying nature. Most of us have read of the smart trick which Jacob played upon his father-in-law; and in somewhat more recent years Mr. Warfield, the eminent cattle breeder of Kentucky, relates that an Alderney heifer grazing in the same field with a number of army horses, produced a heifer calf with the letters U.S. distinctly marked in white hairs on the left shoulder, which peculiarity was also noticeable in her heifer calf. While variations of this description are interesting, they are not so frequent among the domestic animals as they are in the human species and may therefore be held to scarcely affect practical breeding operations. The two last mentioned variations are, needless to say, much more likely to occur in animals of a highly sensitive, nervous temperament than in those of a more lymphatic and lethargic nature.

Having now briefly mentioned the laws which govern the science of breeding, it may be well to devote a few words to their application. By the careful selection of good individuals of proven prepotency all the varieties of the horse now known as pure breeds have been brought to the present standard of excellence; and by using the standard thus made ready to his hand, I believe it is possible for the modern horseman to breed any kind of horse he may fancy. While I do not propose to advise farmers as to the particular kind they ought to breed, I may here formulate a few brief rules, the observance of which will, I am certain, take no money out of their pockets:—

1. Use only pure-bred sires; or, at least, such as have sufficient line breeding to insure prepotency. In this way an amount of certainty in experiment, so to speak, is obtained, and the danger of reversion to an inferior type is greatly lessened.

2. Do not club your mares, even at greatly reduced rates, to any one horse; but carefully study the good and bad points of each, with the object of stinting her to the horse best adapted to improve her good points and remedy her defects.

3. Watch carefully the horse markets of the world, and study the questions of supply and demand in horse-flesh, so that you may be able, in the near future, to command the highest price for the produce of your labour and skill.

4. Avoid violent crossing. All deformed colts are not caused by mental impressions, very many being due to the foolish but too common practice of stinting small light mares to heavy draught sires. It is well known that some stallions are notorious for this sort of thing; and it is a curious but instructive fact that the worst offender I ever knew was himself a small horse, but bred from extra heavy Clydesdale stock on both sides of the house. While this is, perhaps the most objectionable, all violent crossing will be found, as a rule unsatisfactory.

5. Breed only from sound stock. I cannot impress this maxim too strongly upon you. The Royal Agricultural Society of England, acting upon the advice of the Royal College of Veterinary Surgeons, disqualifies for premiums, horses suffering

from any of the following diseases: roaring or whistling, ring bone, side bone, navicular disease, curb, bone spavin, bog-spavin, grease, shivering and cataract; and, under certain circumstances, splint, string-halt, contracted feet, weak feet and bursal enlargements, such as throughpin and wind galls. You will be wise, then, to look out for these maladies and to refrain from breeding from animals of either sex afflicted with them, as also from parents of faulty conformation or weakly constitution, there being quite enough unsound and shapeless horses in the country without your deliberately adding to the number.

THE TREATMENT OF MARES IN FOAL.

As the foaling season approaches, owners of pregnant mares are naturally somewhat concerned for their welfare, and as many Canadian farmers have a comparatively limited experience in horse breeding, a few hints as to the proper diet and general treatment of the prospective equine matrons may not come amiss. The mortality among both mares and foals in this country is very much larger than it ought to be, and while in some instances doubtless, loss is unavoidable, in a great majority of cases the death of either dam or progeny is directly traceable to the ignorance, carelessness or cupidity of the owner.

In the first place a great many mares are annually bred which ought not to be put to the horse at all. The farmer who has but one breeding female and who calculates generously to give his mare a week's rest at foaling time, would in most cases find himself in pocket by either keeping her religiously from the stallion, or if unable to resist the temptation, by trading her for a gelding. No mare can be reasonably expected to work hard at all kinds of drudgery from year's end to year's end and at the same time develop, deliver and rear a foal at all likely to prove an ornament to his species or a source of profit to his owner. Mares used in this way are the victims of gross injustice, and such a system of horse breeding can end only in disgust and disappointment. Only such animals should be stinted as can be spared from the rougher and more arduous tasks of the farm both during pregnancy and for some time after foaling. The man who puts a good mare to the horse, rattles her through a stiff harvest, lifts an engine or separator with her several times in the fall, trots her sharply home from the elevator, hauls wood and hay with her all winter over all sorts of roads, her sole respite being in stormy weather when she stands tied up in a none too comfortable stable, on the hardest of hard feed, puts her into spring work and only removes the harness when labor pains make their appearance, is often the first to complain of bad luck because his breeding operations are not a success. The confidence of such men in Providence and in the procreative powers of their long suffering mares is apparently unbounded, for they never seem to profit by experience, failure appearing only to stimulate them to fresh experiments on the same lines. The number of abortions and premature births among mares handled in this unreasoning and unreasonable fashion is enormous, while malformation, malnutrition and malposition of the fœtus are frequently induced in this manner. Of five mares which I noticed, some years ago now, one morning in March, tugging and straining over bare roads with big sleigh loads of wood, two aborted, one dropped a dead foal, one had the foal removed piecemeal, while the fifth after considerable difficulty actually succeeded in rearing a creature in some few general characteristics resembling the species to which he belonged.

In sharp contrast to the above-mentioned manner of handling mares is the pampering system, and while slightly preferable it is very far from being correct or advisable. In this case the pregnant mare is kept entirely idle during the winter; she is in foal, therefore she must not only do no work, but she must not leave the stable, lest she catch cold, lest she slip and fall, lest she run about and over exert herself. She is overfed with stimulating food, the system becomes loaded with fat, the muscular tissues

are flaccid, the excretory organs are torpid, the circulation is languid, and when at last the foal sees the light it is puny, weak and undeveloped, more likely to die than to live, while if any trouble or obstacle presents itself during the act of parturition the mare herself is apt to fall a victim to the mistaken kindness of an over indulgent owner. Many mares also are treated in this fashion all winter, and with the system weakened throughout by lack of proper exercise and other means mentioned above, are turned into hard exhausting work on the advent of spring, in some cases when they are within a few weeks of foaling.

There is, however, a medium course, by which a great deal of useful work can be obtained from a brood mare, not only without injury, but with positive benefit to both the dam and progeny. Steady—mark the word—not too heavy employment, is even better for a pregnant mare than total idleness, but especially during the last half of pregnancy, it ought to be one thing or the other, either the collar should be taken off and kept off for good or it should be worn more or less every decent day throughout the winter. The far too frequent custom of allowing mares to stand idle on full feed for periods varying from one week to four, and then suddenly starting them off to the distant haystack or wood lot, perhaps ploughing through snow up to the belly or straining across bare spots with a big load behind them, can not be too strongly condemned. Such treatment is hard enough on any horse, but when meted out to heavy brood mares it is cruelty to animals in the first degree. It is little wonder that so many foals are annually quietly interred in barn-yard manure heaps, and that so many mares prove "not in foal" when the expectant stallion owner puts in an appearance to claim his reward.

Every man who wishes to raise foals successfully ought to have a yard, well sheltered by straw if nothing else, in which his mares when otherwise idle may exercise themselves for several hours a day, thus keeping the muscles developed and the vital organs in full and healthy play, so that when called upon, should necessity arise, to do a little work, no shock may be given to the system. A good, roomy, clean and well ventilated loose-box should also be provided for each matron, so that perfect rest may be nightly obtained, and in case of abortion from any cause the isolation thus secured may be the means of preventing similar misfortune to some other member of the stud. When brood mares are worked they should be driven only by reliable and trustworthy men; over exertion, sharp backing or rough handling of any kind should be unknown, the single-trees should be longer than those in ordinary use, deep snow or other bad footing should be sedulously avoided, riding forbidden, and whip entirely banished from the neighbourhood.

The diet should be generous but judicious; if too dry and stimulating it may cause constipation, with torpidity of the liver and other organs, seriously affecting the development of the fœtus, while if too relaxing it will produce a looseness and flaccidity of the whole system, and a general lack of vigour with a tendency to abortion on the slightest provocation. Coarse, bulky, indigestible foods should be avoided, as also any sour, musty, frozen or fermented articles of diet, while all sudden changes are to be condemned. Bran may be given with freedom, but flax seed, oil meal or oil cake, ought to be used with great caution, and only when a decided tendency to constipation is known to exist. A liberal supply of good hay, a little oats and bran twice a day, with soft feed at night, and a regular allowance of salt is fair feeding for any mare, but common sense must be employed and the system regulated by a gradual and judicious adjustment of the component parts of the diet. Ice-cold water occasionally induces abortion, and when possible the chill should therefore be taken off. All surgical operations are attended with danger, and medicine should be entirely tabooed, save in case of vital emergency—physic especially, having a tendency to relax the womb as well as the bowels, ought to be given only when absolutely necessary. Young mares should be often gently handled all over and accustomed to having the

udder and flanks touched, this simple precaution frequently obviating a great deal of subsequent trouble and annoyance. As the time approaches for the mare to foal she ought to be closely watched, so that should assistance—not mischievous interference—be required it may be furnished without loss of time.

With regard to the symptoms of approaching parturition, no rule can be laid down, as many mares will loosen up, make bag, form wax and even run milk weeks before they foal, while others will do none of these things, but simply lie down and institute proceedings without any warning whatever. As a general thing, however, when the teats are full and the piece of wax on the end is succeeded by a drop of milk, when the hips have sunk and the vulva has relaxed, while the animal shows symptons of more or less uneasiness, the act of foaling is not far off. The treatment to be afforded to the foal and to its dam after the act of parturition has been accomplished may conveniently be considered in another chapter.

THE CARE OF YOUNG FOALS.

It is well known among breeders that it is very difficult to catch a mare in the act of parturition, and that if the foetus is in proper position, and everything else favourable, birth occurs very quickly and easily. Should you, however, happen to be on hand when your mare foals, and the youngster is coming right, but not progressing as fast as he might, it will do no harm to rupture the membranes and help a little, pulling only when the mare presses, and always in a downward direction or towards the hind feet of the dam. It would appear on first impression that the breath is a necessary and indispensable adjunct to life; but in the unborn foal such is, of course, not the case—the first inspiration is taken upon the advent to the open air, of the little animal, and it is of importance that nothing shall interfere with the supply of oxygen to the lungs as they begin to assume their vital functions. Many foals are lost through the nasal passages being occluded by the fœtal membranes or otherwise, the first feeble attempts of respiration proving of no avail, the blood fails to become oxygenated, the next effort is weaker still, the heart's action, at the best uncertain owing to the sudden change in the course of the circulation, soon ceases entirely, and independent existence ends before fairly begun.

As soon as the foal has emerged, free the head from the envelopes, see that the air passages are clear of mucous or other fluid, and lay the animal on his right side. If the umbilical cord or naval string is not ruptured at birth, it may be tied with a stout cord a couple of inches from the navel and cut below the ligature, and to prevent blood poisoning, or the absorption of septic germs, it may be dressed with a strong solution of carbolic acid, care being taken not to injure the surrounding tissues, or it may be temporarily smeared with carbolic oil. Should animation appear to be suspended while the heart still beats, an attempt may be made to resuscitate the little creature by pouring cold water in small quantities on the head, slapping the body with a cold wet cloth, holding ammonia to the nostrils or even by what is generally more convenient, puffing a little tobacco smoke into them. Should these measures fail, a little blood may be taken from the navel, but when syncope is present there is no great hope of bringing about recovery.

I would like here to interpolate a little advice regarding foals "coming wrong." If there is any malposition of the fœtus not of a serious nature, you may, if you are at hand, be able to rectify it, using judgment and common sense, bearing in mind that a mare will not stand much rough handling, and, above all, keeping cool and endeavouring to avoid excitement, which at such times is very natural and very dangerous. Should you find yourself unable to remedy the evil, lose no time, but send at once for professional assistance if such can be procured, and, meanwhile,

allow no interference save by some intelligent and thoroughly experience stockman who understands the vital importance of absolute cleanliness and who will know, after making an examination, whether he can do any good or not, and will guide himself accordingly. Great harm may result from well meant but mischievous interference with these cases, and the veterinary surgeon often finds on his arrival a well nigh hopeless subject which, if let alone, he might have handled with one tithe of the trouble and with far greater certainty of saving life.

Space will not allow of our entering into the details of the various abnormal presentations to which the equine fœtus is liable, and of the modes of manipulating them to effect delivery, and such is not the object of this article. We will suppose that the foal is dropped safely and lying breathing and sneezing behind his dam, who has just had the gruel with which she ought always to be rewarded after the termination of her labour. The mare will generally, on rising, turn round and begin fondly to nose and lick her progeny, a process, by the way, of great importance and value to the latter; but young and nervous mares, especially if delivery has been protracted and painful, will often act in an entirely different manner, snorting, pawing and evincing fear and irritation at sight of their offspring. Under such circumstances it is well to protect the foal for a time by a small hurdle or gate placed across one corner of the roomy, airy, dry and warm loose-box, in which, it is presumed, he has first seen the light, to rub him smartly but gently with soft rough towels and to endeavour to induce the mare to begin the licking process by sprinkling the youngster with a little dry bran or meal and salt. Such measures are not, however, often necessary, kind considerate treatment and judicious letting alone generally proving effectual in bringing about a reconcilation in the family.

Plenty of dry, clean bedding should be furnished, the shorter the better, for the foal will soon begin to tumble about in repeated attempts to get his long and shaky legs under him. If he does not succeed after a reasonable time in getting on his pins, a little assistance may be given, and his dam proving friendly, he will soon, if let alone, find his way to the maternal font; but if he is unable to stand, or the mare is touchy and restive, she ought to be held while he is guided to the teat and allowed to obtain nourishment. If the foal is weak and quite incapable of supporting himself, the mare may be milked and the fluid thus obtained given to him slowly and very carefully, it being a matter of great importance that the little chap obtain if possible some of the very first milk secreted by the mare. When once friendly and confidential relations have been established between mare and foal, they should be left alone for some time, care, however, being taken to remove the placental membranes from the stall as soon as they are dropped.

If the mare has gone much over her time and especially if she has lost much milk, it will be necessary to watch the foal closely for symptoms of constipation, which will be manifested in the first place by continued elevation of the tail accompanied by straining without the passage of fæces. This will be succeeded by dulness and then by evidence of pain, the abdomen will become bloated, the little animal will show great uneasiness and begin to perspire and the pulse and respiration will be accelerated. In the early stages a few ounces of soapy warm water or a little raw linseed oil introduced by a syringe into the rectum will generally afford relief, but should acute pain and distress make their appearance, the administration of two or three ounces of castor oil with twenty or thirty drops of laudanum and half a teaspoonful of turpentine well shaken up, will be in order; a small enema should also be given from time to time, and the abdomen covered with a woollen cloth wrung out of hot water. These measures if adopted in time will usually be sufficient and it must not be forgotten that the administration of medicine to newly born foals is fraught with great danger so that the mechanical remedies, viz., the injections and the stupes to the abdomen are much preferable to large or repeated doses of physic.

Diarrhœa may set in, either spontaneously from septic causes or as a result of the free use of medicinal agents, the mortality among young foals from this affection being very great. The treatment will depend on the origin of the trouble—if from medicine little can be done save in keeping the strength supported by stimulants and concentrated nourishment, and for this purpose an egg beaten up with a teaspoonful of brandy and a few ounces of milk from the mare will be found very effective—this mixture may be repeated from time to time as the condition of the patient may demand. Should the diarrhœa on the other hand, appear to originate spontaneously, it is possibly due to irritation of the bowels, and in such cases no treatment is more successful than the exhibition of one or two table-spoonsful of castor oil with a little laudanum to allay any tendency towards griping. No relief being afforded by these measures it is advisable to try an antacid, and for this purpose a table-spoonful of lime water may be given in two or three ounces of milk from the mare every three or four hours, while the strength of the patient is to be sustained by stimulants and nourishment as recommended above.

Where veterinary assistance is not available, five to fifteen grains of grey powder given twice a day will often be found beneficial.

In severe and protracted cases of septic origin formalin has been successfully used. This agent must, however, be used with caution, the best mode of administration being as follows: Dissolve one fluid ounce of commercial formalin in 10 ounces of water and give of this solution a teasponful or a teaspoonful and a half, according to the size of the colt, in one pint of milk, twice or at most three times a day.

Small injections of flour gruel or very thin starch containing a little laudanum are also useful.

The greatest attention should be paid to the sanitary conditions; the stable as well as the patient and the dam should be kept scrupulously clean while the diet of the latter should be closely watched and changed gradually from time to time. The facts that animals on pasture are seldom affected and that the malady once established in a stable, appears to recur regularly, are strong arguments in favour of the adoption of all possible hygenic precautions.

Another and perhaps the most fatal disease to which young foals are liable is suppurative inflammation of the navel and joints often erroneously termed inflammatory rheumatism. The first symptom of this malady is a difficulty of motion, accompanied by a swelling in the region of the navel or in one or more of the joints, the swelling rapidly increasing in size and terminating in large abscesses containing enormous quantities of unhealthy pus. The progress of the disease is characterized by high fever, rapid emacition and great weakness followed by stupor, fœtid diarrhœa, general marasmus and death. Curative treatment does not appear to be of much avail: the opening of the navel if inflamed should be frequently dressed with carbolic lotion, or other suitable antiseptic, a mild anodyne liniment applied to the swellings, the bowels gently moved by a small dose of oil and the strength sustained by concentrated nourishment and the judicious use of stimulants, while the abscesses when ripe are to be freely opened and the cavities injected with an antiseptic solution. The disease is septic and an ounce of prevention is worth a pound of cure. It is almost invariably due to the absorption of germs (streptococci) by the exposed end of the umbilical cord or navel thus affording good reason for the treatment of that part recommended above. With a view to the prevention of this disease also, the most scrupulous cleanliness should be observed in the housing of young foals and their dams; the all too common custom of letting them lie on a couple of feet of heating manure thinly covered with straw, or on a cold wet earthen floor, cannot be too strongly condemned. The floor and bedding should always be dry and clean

while an occasional sprinkling of lime will not cost much and will add greatly to the healthfulness of the inmates.

Where the existence of infection is suspected the floors and stalls should be thoroughly scrubbed with boiling water and subsequently treated with a reliable disinfectant such as crude carbolic, creolin, or a solution of corrosive sublimate of a strength of one part to 1000 parts of water.

Occasionally the urine continues to dribble from the naval opening owing to the duct from the bladder having failed to close after birth. In such cases the parts should be thoroughly cleansed and rendered aseptic after which a subcutaneous ligature is to be applied but this like all other operations requiring surgical skill, and in fact all really serious or acute conditions should, when possible, be relegated to the qualified veterinarian.

There are of course numerous other ailments and accidents to which young foals are liable, but those mentioned are responsible for the needless loss of many valuable animals and should, therefore, be carefully guarded against and promptly but cautiously dealt with on the first indication of trouble.

THE CARE OF WEANLINGS.

To some, advice on this head is, of course, superfluous, but others, less experienced, may be glad of a few hints as to the most approved methods of starting the youngster on an independent career. In the first place, be certain that your foal is old enough to wean, that he is in fair condition, thriving and healthy, that he knows what grain is and what it is for, and that, should you have any cow's milk to spare, he will not be above drinking it. As to age, no colt should, if at all possible, be permanently separated from his dam until he is at least four months old, while another month, or even two, by her side will make him a better horse and lessen considerably the risks of his first winter. Many farmers, however, who are trying to raise colts can ill afford to let their mares suckle so long, and while it might, in many cases, be more profitable for such men to refrain from breeding altogether, the fact remains that they must use the mares on the farm, and the foals have to suffer accordingly.

It is a good plan to teach the foal to eat out of the same box as his dam, and it is astonishing how little tuition, even with very young colts, is necessary when the food is placed within easy reach. For some time also before the foal is actually weaned he should be schooled to drink milk, if there is milk to be had, and it is well to remember in this connection that milk drinking is an accomplishment of no little value for any horse to acquire, nothing being more advantageous to an animal suffering from any febrile or debilitating disease, than the voluntary absorption of milk in lieu of other fluid when the appetite for solids is capricious or altogether lost. As regards the diet best suited for young foals, many different opinions are promulgated, but in the experience of the writer nothing is equal to good sound oats with a moderate mixture of bran twice a day, and a well scalded, not too bulky, mash of the same materials, seasoned with a tablespoonful of salt, and perhaps a handful of crushed oil cake for the evening meal. Many recommend crushed oats, but repeated trials have convinced the most successful breeders that whole oats are more nutritious, and if properly masticated, as they generally are when fed with dry bran, more easily digested than chopped feed of any kind.

Colts should be halter broken and taught to lead when yet with the dam, as this renders them much more tractable and easily controlled during the excitement inseparable from weaning, and also facilitates housing when the accommodation is limited, and there are several to be kept together. Loose-boxes are preferable to ordinary stalls for young stock, but provided the stable is clean, airy and well lighted it will do no harm to have them tied at night, taking it for granted that they enjoy for the

greater part of every day the freedom of a roomy, and in winter, well sheltered yard. This latter point is of very great importance. Your youngster must have a chance to develop bone and muscle, and in no other way than by lots of exercise can he be reasonably expected to properly assimilate the generous diet recommended above, while despite all old-fashioned ideas to the contrary, without a liberal grain allowance he will not likely be much to look at when the sun begins to melt the snow in the spring. When two or more colts are kept together it is better to have them separated at feeding times, or the strongest of the lot will be apt to wax fat at the expense of his weaker or less voracious companions, many backward colts being literally starved by careless neglect of this simple precautionary measure.

Weanlings are frequently troubled to a considerable extent with intestinal worms of various kinds, especially if grazed on low lying pastures in late summer or early fall. Some of these parasites are more to be dreaded than others, but none of them are desirable guests or in any way beneficial to their involuntary hosts, and it is, therefore, advisable to take measures for their removal. The old farmer's remedy of wood ashes and salt is not to be laughed at in this connection, and if persevered with in small doses for some time will often have the desired effect, but where a more speedy and certain riddance is desired it is well to give a course of anthelmintic powders, as iron sulphate 1 drachm or powdered areca nut 2 or 3 drachms twice a day in a little soft food for a week, to be followed by a drench composed of turpentine 1 oz., and raw linseed oil from 10 oz. to a pint, according to the size and condition of the patient. This mixture should be given on an empty stomach and all dry food withheld until the bowels have responded to its action. In all cases of intestinal worms, benefit is found from occasional injections of tepid water strongly impregnated with soap, and for this purpose Gamgee's enema funnel, a cheap and convenient instrument easily turned out by any tinsmith, will be found suitable. Some varieties of worms demand for their successful removal a repetition of the medicinal treatment; but those most commonly met are generally satisfactorily disposed of at the first attempt.

External parasites should also be guarded against. Many a good colt has gone to skin and bone from the constant irritation and uneasiness produced by lice, and whenever a young animal shows unaccountable loss of condition and want of thrift it is advisable to examine him closely for signs of the presence of these undesirable companions. Should they be detected, the sufferer may in reasonably mild weather be washed well with carbolic soap and soft warm water, and after thoroughly drying the skin, carefully and closely dressed, more particularly about the roots of the mane, with a good insecticide. For this purpose an ointment composed of equal parts by weight of sulphur and lard will be found effectual, as also safe, cheap and easily procured. In cold weather the washing must of course be dispensed with, but the ointment may be applied without risk in a moderately warm stable at any season of the year.

When colts are debarred from taking much outdoor exercise their hoofs very soon become deformed, and great harm is often done to the bony and tendonous structures of the limbs from neglect to properly trim and regulate the growth of the horny coverings of the feet. Accidents of various kinds are liable to occur, and in all cases the advantage of having the patients halter-broken, thoroughly domesticated and free from fear of their human friends is incalculable. This state of affairs can only be brought about by the most careful, systematic and painstaking handling of the young animals from the time they are foaled, but more especially during the first week or two after weaning.

APPENDIX No. 18.

OTTAWA, June 28, 1911.

The Honourable.
The Minister of Agriculture,
Ottawa, Ont.

SIR,—I have the honour to present herewith a paper by Mr. H. S. Arkell, B.S.A., Assistant Live Stock Commissioner, entitled 'Observations upon Government Assistance to Agriculture in Certain Countries of Europe.'

This paper contains much useful and valuable information regarding the methods followed by various European Departments of Agriculture in effecting the dissemination of useful knowledge and otherwise assisting in the development of the agricultural resources of their respective countries. I am satisfied that it will be read with interest and profit by many Canadian farmers and would, therefore, recommend that it be published for distribution as Bulletin No. 15 of the Live Stock Branch.

I have the honour to be, sir,

Your obedient servant,

J. G. RUTHERFORD,
Veterinary Director General and Live Stock Commissioner.

OBSERVATIONS UPON GOVERNMENT ASSISTANCE TO AGRICULTURE IN CERTAIN COUNTRIES OF EUROPE.

The observations upon the particular assistance rendered to agriculture and agricultural industries by the governments of certain countries in Europe, as contained in this report, are based upon notes made by the author while on a visit to Great Britain, France and Belgium during the summer of 1909. It had been the original intention, in planning this visit, to confine the account to an inquiry into the nature of the work undertaken in connection with horse breeding, but the organization of the Department of Agriculture in Ireland seemed to offer such valuable suggestions, that a brief outline is included of the operation of measures in use by it for the encouragement and development of general agriculture in that country. As originally presented these notes were issued in the form of a report to the then Minister of Agriculture of the province of Quebec, with whose assistance they were obtained and prepared. They have now been partially rewritten and revised in so far as seemed necessary, in order to extend their suggestion and application to the wider field of the agriculture of Canada.

Ireland's need, agriculturally, had been seriously recognized for many years, and it will be remembered that a Royal Commission took evidence, in 1907, upon the nature of congestion in the rural districts.The memoranda, compiled by this commission, established very pointedly that lack of information and lack of organization had been two features of very great importance in retarding progress and in continuing conditions which had maintained poverty upon the land. Previous to 1899, the efforts of the Royal Dublin Society had been directed strongly toward the improvement of conditions amongst the farming population, but, in part, the somewhat local nature of its

organization prevented its work from having the wide significance that was necessary and in the end found desirable. It paved the way, however, for a more comprehensive policy and in 1899 an Act was passed creating a Department of Agriculture and Technical Instruction for Ireland, whose business it has been to administer a rather large amount of money and machinery in the interests of Irish agriculture.

For convenience sake, the work undertaken by this body may be considered under three heads:—

1. Agricultural instruction.
2. Improvement of live stock.
3. Special investigations.

Professor Campbell states in his evidence before the Royal Commission that after the organization of the Department, the first duty of the staff was to attend meetings of county councils for the purpose of explaining to them the provisions of the Act and to receive and consider suggestions as to what the Department should do for agricultural development. During these visits advantage was taken of studying the peculiarities of Irish agriculture with a view to meeting the particular need of the various counties in a more intelligent way. The conclusions arrived at were to the effect:—

1. That the most important work which the Department had to perform was that of laying the foundation of a system of agricultural education.

2. That the application of the Department's energies might be effectively directed, in the interests of the farming community, toward the improvement of live stock.

3. That further projects of a more specific nature in the way of special investigations might wisely be undertaken because of their value for demonstration and experimentation.

It is proposed to give a brief outline of what methods have been pursued in these three directions and, as far as possible, an appreciation of the value of the work to the country.

AGRICULTURAL EDUCATION.

The general scheme evolved was framed in such a manner that it might adapt itself to the peculiar conditions of the country. The scheme provides in the first place for a system, in each county, of 'itinerant instruction' in agriculture, horticulture, dairying and poultry-keeping, such that a fund of information and a source of advice may be readily accessible to farmers and their sons who, in many cases, have few other means of acquiring it. This method of instruction was followed in subsequent years by winter schools of agriculture, held at various centres in the counties, where a little more systematic training was made possible, but which could still be obtained at small expense.

Upon the work of this itinerant instruction is based the permanent institution of the agricultural schools and colleges. At three stations in the country young men are taken in as apprentices for one year and receive practical and technical training in agriculture for a moderate fee. More stations would have been established had teachers been available, but there has been a lack of these from the start.

This station work, in turn, leads up to that of the central institution for the country, the Albert Agricultural College at Glasnevin which is in affiliation with the Royal College of Science in Dublin. At this college is provided the highest form of technical education for the training of men who are to become teachers and specialists in agriculture.

A conception of the nature and policy of the work undertaken in connection with education can be gathered from the above summary of the methods employed, as well as an idea of the purpose that suggested the framework of the whole institution.The details of the attendance in the various branches will indicate what has

been accomplished. In 1907-8, there were enrolled in the agricultural course at the Royal College of Science, 26 students; at the Albert Agricultural College, 73 students; in the three schools at Athenry, Ballyhaise and Clonakilty, 66 students, and at the winter classes in the counties, of which there were 33, 529 students. Most of the courses in these winter classes were from fifteen to twenty weeks duration.

As a supplement to the regularly organized system of education, as outlined above 1,453 lectures were given by itinerant instructors, of whom there were 34, at which 81,276 persons were present. Much other work of like nature in connection with dairying, poultry raising, plot demonstration, spraying, bee keeping and butter making, was also undertaken, but of which the details may be omitted. The greater part of this general work is placed in charge of the itinerant and private instructors and their efforts are affecting noticeable improvement in the methods employed by the farmers. The co-operation of the county councils in relation to this itinerant instruction is obtained by placing a large share of its direction under their control. The final responsibility, however, works back naturally to the central authority, and a comprehensive system is thus constituted by which the organized effort may be rendered most acceptable and efficient according to the needs and opportunities of the various districts.

The following statements may serve to reveal the gradual but satisfactory growth in popularity of the general scheme. In 1902-3, there were but two winter classes organized with an enrolment of 44 pupils. In 1903-4, the pupils numbered 161; in 1904-5, 317; in 1905-6, 422; in 1906-7, 449; and in 1908-9, 529. Such an expansion is particularly suggestive as indicating the degree in which these classes have grown in popular favour. Another instance of the same general fact may be given. In 1900-1, there were but three itinerant instructors at work, one in each of three counties, while in 1907-8, there were 34, and these were distributed through practically all the counties of Ireland.

For an estimate of the actual monetary value of this work, the following table giving the export value of eggs and butter will be suggestive.

	1904.	1907.
Butter exported..	£3,793,391	£4,008,220
Eggs exported..	£2,257,362	£2,920,539

It is estimated that the annual increase in the value of eggs exported pays of itself the cost, to the country, of the Department of Agriculture. Much encouragement has been given through the facts noted, to those who have been engaged in agricultural education in Ireland, and particularly to those upon whose shoulders has fallen the major share of its direction and control.

IMPROVEMENT OF LIVE STOCK.

Apparently the most popular of all the undertakings of the Department has been that which has had to do with the improvement of live stock. The energies of the Royal Dublin Society had been in earlier years more particularly engaged in this direction. The Irish farmer's income is derived mainly from live stock and, after the passage of the Act, the interests of those engaged in the industry were early placed before the Department for its consideration. Whatever has been attempted has been undertaken in co-operation with the local county committees upon whom in fact has fallen much of the management and supervision of the details of the various schemes. It may be stated here that the Act empowered the county councils to impose a rate equal to one penny in the pound, on the taxable value of rural districts, comprised within the county, for the purposes of agriculture and such other rural industries upon which they were authorized to expend money. In the majority

of instances in the case of counties that were able to afford it, the initiative and assistance of the Department depended upon the action of the counties in assessing themselves for the purposes of the schemes in question. The fact that every county in Ireland now voluntarily so assesses itself to make good its share of the expenditure connected with the undertaking, is perhaps the best guarantee of the need and utility of the whole enterprise.

In connection with the live stock improvement scheme there are three lines of work involved, that with horses, that with cattle, and that with swine. For convenience sake, the horse-breeding scheme may be treated of at this point in conjunction with the other two, though at the risk of breaking the account when the methods employed in horse-breeding in other countries are dealt with.

HORSE-BREEDING.

It may be here noted that Irish saddle horses have been for many years accorded rather a fine reputation on the English markets and that they have chiefly gained favour as hunters and for chargers and remounts in the British army. The lines of effort followed by the Department have been mainly to conserve this type and to promote the breeding of this class of horse more generally throughout the country. It was found that the introduction of draught blood into Ireland was playing havoc with the breeding of saddle horses and the use of draught sires is now confined to certain counties only and even to limited areas in these counties. The first business of the Department was to invite applications from owners of high class stallions to have their animals inspected for suitability and soundness, which inspection became the basis for enrolment into its register and for a subsequent subsidy. The standard of recognition and entry into the register was placed on a high level at the beginning and more than one-third of the horses presented were rejected as being unsuitable for use as sires. Much disappointment was caused by this seemingly stringent regulation, but it is now realized that it has been of direct advantage to the country, since it has led to the importation of a large number of good sound sires and as Professor Campbell says: 'a larger number of worthless animals which would otherwise have been imported have been excluded.'

The Department advertises in September of each year that it is prepared to open a register. The applications are received in October and November for such stallions as have already stood at stud in Ireland. Applications for other stallions must be forwarded in September. After the applications have been received, an officer is sent to the country to inspect the stallions entered. His examination is in respect to appearance and soundness. In addition to this inspection, there are other regulations required to entitle the stallion to entry in the register and no stallion not in the register can receive a subsidy. Stallions which are approved are accepted for particular districts only and may not without the written consent of the Department be removed to other districts. In 1908, there were 296 stallions on the register, while in 1901, there were but 128. The increase has been due largely to the desire of farmers not only to have their horses receive the official recognition of the Department, but that as well, through this recognition, they may obtain assurance of increased patronage from the farmers and breeders. It may be added that in the event of there not being a sufficient number of registered stallions in any county for breeding purposes, the Department has, through a well-controlled system of loans, enabled individuals and societies to purchase approved stallions on easy terms.

In making such a loan, it is a matter of first importance that the interest of the community be well served. There is also a proviso attached that the total amount of the loan shall be paid in regular annual instalments in five year's time, during which time or until the loan be paid the stallion remains in substance the property of the Department.

Another feature of the horse-breeding scheme which parallels the registration of stallions is the selection or nomination of mares, a feature which helps to induce farmers to retain their best mares for breeding purposes. In the spring, exhibitions of mares are held in the counties where a limited number of the largest and best are selected, to the owners of which nomination tickets are issued entitling each to select any registered stallion to mate with his mare. This ticket is given to the stallion owner at time of service in lieu of fee, and he in turn, upon presentation of the ticket, collects his money from the Department. The ticket has a value of from £2 to £3, and if the service fee exceeds that amount the difference must be paid by the owner of the mare. In 1907-8, there were in all 11,036 mares presented at these exhibitions, of which number 5,442 received nominations.

In the popular estimate the subsidy to the mares has been the most effective part of the scheme, but the Director of the work holds very strongly to the opinion that the registration of the stallions has been of greatest value to the country. The utility of the undertaking appears to lie in the stimulus and impetus it gives to systematic breeding, particularly as regards selection and judicious mating and again in the greater degree of uniformity which it promotes and renders possible in the animals that are bred and reared throughout the country. It may be thought to involve too large an expenditure to be continued for any great length of time. It would appear, however, that its service is largely initiatory and educational and that shortly the burden of its continuance may be thrust back upon the communities as they acquire the ability to carry it on themselves.

CATTLE-BREEDING.

The cattle-breeding scheme has been an especially valuable one to the Irish farmers and one in which they have taken great interest. There is a very large trade between Ireland and England in store cattle, which are bred and reared in Ireland and fattened in England and Scotland. A keen demand has always existed for well-bred, early maturing animals and the better class of bulls introduced by the Department into the country has had a decided influence in levelling up the capacity of the cattle to take on flesh. Such was the opinion expressed to the writer by the well-known editor of the *Scottish Farmer* in the course of an enthusiastic comment upon agricultural organization in Ireland. From what could be learned, no scheme has received greater endorsation at the hands of the farmers and none has brought greater financial advantage to the country.

Briefly it consists in this. The Agricultural Committees of the County Councils offer subsidies of £15 each to the owners of high-class bulls, provided that they allow the use of their bulls to farmers at the nominal fee of one shilling per cow. Government inspectors make a selection of bulls in the country as a basis for awarding the premiums and, in addition, personally attend fairs and sales with a view to the purchase of suitable animals for resale on easy terms to individuals or to county organizations. In 1908-9, there were 999 bulls receiving premiums in this way.

Dairy cattle-breeding is also receiving attention in connection with this work though the methods employed are somewhat different from the above. The main virtue of the scheme lies, no doubt, in the generous introduction of new and better blood into the country and, were it not for the poverty of the farmers, the same results could be obtained with a much smaller expenditure of money. It will be remembered, however, that half what is required is met by a tax which the counties lay upon themselves and it seems to be the opinion that no other money expenditure has been more directly successful in carrying increased revenue to the farm.

The assistance given to swine breeding is organized in much the same manner as in the cattle-breeding scheme and the details of it need not be described. The production of pork is a great industry in Ireland, and the attempt is being made to

develop the country into a larger and more influential competitor for trade in the markets of Great Britain.

In connection with the work of live stock improvement one fact has made itself very evident in Ireland, viz., the scarcity of suitable breeding sires in all classes. Not only has this scarcity been made apparent, but difficulty has been experienced in supplying the need through importation or otherwise. It has been noted that the stimulus and encouragement which has been incidentally given to the breeding of pure bred stock has been one of the most hopeful signs during the development of the work. The scarcity which Ireland feels and has felt will be realized and appreciated by any country as it undertakes progressive work in the same direction and is, it will be admitted, a very certain guarantee of the need of something being attempted. It has been further demonstrated that, with improvement in the lower grades, greater progress is made possible amongst the breeders of the better classes of stock and there is thus a compensating activity in either direction that works toward the mutual advantage of all concerned.

SPECIAL INVESTIGATIONS.

The special investigations undertaken in the various branches of agriculture follow along the channels through which government assistance is very frequently given in this country. They touch in concrete fashion the primary element of production and the people have reaped a direct advantage as the results, through demonstration and illustration, have been placed within their reach. It is worth mentioning that, as the farmers have learned to recognize the value of this direct method of work, they have given the greater support and adherence to the movement in favour of agricultural education.

FIELD EXPERIMENTS.

Irish farmers were badly in need of assistance and advice in connection with the management of the soil and in the growing of crops. Igorance of the principles of cultivation, drainage, manuring and seed selection had resulted in wasteful practices and in the incapacity of the farmers to obtain a reasonable and normal return from the land. Consequently much attention has been given to the study of manures and manuring. The results of the experiments in this connection have been embodied in leaflets and distributed over the country and have been drawn upon to furnish the substance of many lectures that have been given by the itinerant instructors.

The Department has viewed with satisfaction the better judgment exercised in the application of manures since its work began and in their increasing use. It believes further that this work alone fully compensates it for what has been spent as a whole on county agricultural instruction. The experiments have covered the principal crops of the farm, viz., oats, potatoes, mangels, turnips and hay.

In connection also with the field experiments, variety tests have been conducted with grains and potatoes. Barley and wheat have received chief attention in these tests because of the value of the one for malting and of the other for milling purposes. Very definite results were obtained in the tests with barley, one variety surpassing all others in suitability for use in Ireland. The potato-growing industry is being extended through the experiments of the Department and the supply of marketable produce is being developed.

Much assistance has been given to the business of flax growing through technical instruction and through experiments with manures and seed. The interests of the tobacco-grower have been considered and the forestry problem has been undertaken in a systematic way, in the attention given to both public and private interests.

In the peat industry, in seed testing and potato spraying, the government's activity has also been exercised and with advantage to the country. In the case of the peat industry, the Department rented an Irish bog, erected peat fuel machinery and demonstrated the process of most successful manufacture. The actual object lesson amongst the people themselves has been found almost the most effective method of stimulating interest and improvement in the work in which the Department has engaged.

In the matter of fruit and vegetable growing, a horticultural expert has been at at work in making a survey and in estimating the capabilities of the country in this regard, particularly in the non-fruit-growing districts. His investigations have extended to giving instruction in the growing, harvesting and marketing of fruit. A profitable outlet for the produce has been made possible, through the extension and in some cases revival of commercial jam-making, fruit-preserving and cider-making.

The poultry industry has been developed through somewhat the same system as has been utilized in connection with the other branches of live stock. Eggs and high class breeding stock have been distributed at moderate prices from central farms, instruction has been offered, the fattening process has been effectually demonstrated and assistance has been given in marketing produce.

Two other industries have received attention, cheese-making and butter-making The first is not of large importance since it cannot be successfully worked conjointly with the raising of store cattle, but encouragement has been given to it where its development was deemed most advisable. Butter-making, however, has long been an important industry of the country, though the methods employed were not of the best, and the product lacked in uniformity and much of it in quality. The Department has turned its attention to the encouragement and development of the creamery system, through the inspection and supervision of creameries, through special courses of instruction for creamery managers and through butter-making competitions. Home dairying has also had its share of attention. The utility of the whole scheme has been spoken of elsewhere.

The important phases have now been covered of the work of the Department in Ireland. From the somewhat general résumé an idea may be obtained of the nature and sphere of its operation, but it is impossible to give an adequate impression of the spirit and motive which underlie it all. The farming population of Ireland has been poor and in some districts the people have suffered from their poverty, particularly as compared with the comforts of civilization which are now believed to be almost indispensable. The barrier of indifference and want of knowledge had made progress an almost impossible and unknown thing. The expenditure of human energy had been wasteful in a high degree and the resources of the country and its people had remained undeveloped and in a large sense unproductive. Ireland's future was menaced through her failure to move forward and in her inability to meet the competition of neighbours and rivals in markets where she had been accustomed to find an outlet for her produce. No one thing has had such an immense and controlling influence on the outlook and possibility of development which it has effected as has the formation and organization of the Department of Agriculture and Technical Instruction. The work undertaken in the interests of agriculture has been especially considered in this inquiry but the Department has engaged itself also in the teaching of domestic science which has opened up possibilities in the home to parallel those upon the land, and in providing facilities for technical instruction which is meeting the claims of technical industries and of those engaged in them, with the same intent and in like degree. The undertaking has been a public spirited enterprise with a large field of labour, and it has borne fruit not only in improving the commercial prospects in the agricultural industries but in stimulating and encouraging the people in educational and social improvement.

The farmers and their families are learning how to do things and the finger of organized intelligence and energy is leaving its impression, upon every phase of operative endeavour in the country. Methods are being improved, production cheapened, markets strengthened and, though such work must necessarily move slowly, substantial progress is being made. Exports are increasing and improving in quality particularly those of potatoes, butter, poultry and eggs, cattle, pork and horticultural products. The general acceptance of and participation in the scheme by every county of Ireland substantiates its popularity and utility. The largest argument in its favour lies in the fact that steps have been taken to make the work permanent. It began with demonstration to catch the eye and stimulate endeavour and is developing, through education, to the teaching of principles and the training of faculties of observation and judgment. Ireland may very well be destined to become an important competitor against countries of established reputations in the great produce markets of Great Britain. If so, she will be another example of what has been and is being successfully accomplished in like manner in Siberia, Denmark, Holland and in lesser degree in other European countries.

HORSE-BREEDING IN FRANCE.

Since much space has been taken in a description of the general field of work in Ireland, the résumé of the methods adopted by other countries in the assistance given to horse-breeding must necessarily be short. Those in France are particularly interesting from the fact that organized effort in this direction has been in progress since the 17th century. In that century, the Government established a stable of stallions at Le Pin, which it has since maintained and from the time of Napoleon it has had almost complete control of the breeding of horses for cavalry purposes. At the outset it may be noted that the policy of the Department has been dominated in a very large sense by the definite purpose of producing and breeding suitable horses for the army. Most of the horses concerned in this policy are owned outright by the Government. The total number of Government-owned stallions in 1907 consisted of 559 thoroughbred, 2,218 French coach (*) and 574 draught, in all 3,351. It will be seen that the great majority of these horses are thoroughbreds and French coach, and are in fact sires of most suitable blood and breeding for the production of army horses. The best animals in the country are selected for this purpose and many high-class English thoroughbreds are imported, together with a few hackneys.

These stallions were, in 1907, distributed over 947 breeding stations and served 150,934 mares. The service fee in all cases is low, varying from 20 to 100 francs or from $4 to $20 in our money. The farmers, therefore, have the opportunity of having their mares served by carefully selected and high-class stallions at moderate rates. The applications for the service of these are determined by lot. Premiums are occasionally given to thoroughbred mares that they may be reserved especially for breeding purposes. The system of selecting and subsidizing mares was at one time resorted to, but, after a trial, has been largely abandoned. Through the donation of prizes at exhibitions, at race meetings and in various other ways, encouragement is further given to the breeding of horses for this purpose.

In this connection it may be stated that a Government school has been established at Le Pin for the training of men who have to do with the selection, inspection and purchase of horses for the Government. By this means a wonderful uniformity has been obtained in the types approved and bred. The training and equipment of special officers as afforded by the Government school has promoted greater efficiency in the public service and has secured a gratifying degree of permanency for the policy of the Department. The whole system has been admirably adapted to the purpose for which it was intended and has given horse-breeding an impetus and a direction of which the country may well be proud. Under ordinary circumstances, however, and

under conditions such as we have in Canada, the method of work involves too large an expenditure of money. A part of the system, nevertheless, not yet described, is worthy of consideration and contains features which, in a modified form, might well be adopted elsewhere.

Reference is to the methods more particularly in vogue in connection with the breeding of draught horses. France has five practically distinct draught breeds, each confined to a particular district of the country. Of these, the Percheron, bred in the district of Perche, is perhaps the most important. From what could be learned the large majority of the mares in this district are registered. They are owned by small farmers who keep usually two or three of each and who almost invariably raise at least one or two colts during the year. At weaning time, these colts are practically all sold to the large stallion owners, who grow them until they are a year and a half old. They then either sell them or put them to work until they are of serviceable age. The young horses as they develop are carefully fed and trained and, at four years, a stallion is well grown in body, kind in harness and well mannered. That he has earned his own living for the last two years has detracted nothing from his value and, it may be, has given to the bone, nerve and muscles of his system a strength and endurance that will prove an asset to him for the rest of his life.

The Government concerns itself chiefly, in connection with the assistance which it renders to the horse-breeding industry, with the stallions retained for breeding purposes. In France, all horses that stand for service must pass an examination as to soundness before Government inspectors and must be officially accepted, after which they receive the mark of a star upon their neck. The rejected ones are brandd with an R and may not be used for breeding purposes. Stallions deemed especially worthy are termed 'approved' and receive subsidies ranging from 300 to 600 francs. These, in 1907, numbered 1,603, and served 82,736 mares. Other stallions accepted, but not

* Also called 'Anglo-Normans or half-bred.'

deemed of more than ordinary merit are termed 'authorized' and receive no subsidy In 1907, there were of these 185 and they served 9,746 mares. In all cases a horse is required to serve fifty mares to obtain a premium. After the season a service record of mares is forwarded to the Department and, after foaling, a record of the foals is given. For draught horses, the service fee varies from 15 to 25 francs. Because of the subsidy, therefore, farmers are able to obtain the use of the best horses at very moderate rates. The encouragement given, through the premium system, to the possession of high-class sires has materially affected the quality and individuality of the horses bred in the district and the principle of the system has been one rather widely adopted in various European countries. The Scotch premium system is well known and Scotch breeders have a large faith in the advantage they have derived from it. In speaking with Mr. Wm. Montgomery, at Kirkendbright, he said: 'We know this system and it has given us the results we want.'

HORSE-BREEDING IN BELGIUM.

In Belgium, the nature of the Government assistance is of much the same character as that rendered through the premium system in France. Government inspection of stallions is obligatory and none may stand for public service except such as are accepted. The card of acceptance is of value for one year only and the official examination is an annual affair. In each district exihibitions or meets are held annually and first, second and sometimes a number of third prizes are awarded for two-year old, three-year old and aged horses, shown in their respective classes. The prizes vary from $15 for a third to $40, $80 and $110 for first prizes in the various sections. Special prizes of $140 and $180 are given at provincial exhibitions where a number of districts compete with their representatives. Another feature is the

awarding of what are known as 'primes de conservation' which may be termed 'retaining premiums.' These are granted, in addition to the above mentioned prizes, for the purpose of retaining the horses for breeding purposes. Under ordinary conditions they vary from $100 to $160. When, in the annual inspection, a horse of exceptional value is found, the above mentioned premium may be replaced by one having a value of $1,000 to $1,200, this amount being payable each year for five years. In this instance, however, the conditions are very rigid and unless they are lived up to the premiums revert to the State. Horses receiving retaining premiums are usually required to serve special selected mares. It was learned that at one time special prizes had been granted to mares but that such were not now awarded.

In conversation with Mr. Prosper Mathieu, a large horse-owner and breeder of Brussels, he expressed himself as well satisfied with the working of the system in Belgium. He preferred the premium system to that of Government ownership of stallions. The uniformity of the horses throughout the country, particularly as regards confirmation, type and colour, could not but be noted and the animals bore the stamp of utility in a marked degree. There is a large market for draught horses in the seaport towns, such as Antwerp, but the biggest trade is with Germany. This country takes large importations every year and judging by figures which were received the Belgian horses are the most valuable of any purchased from foreign countries. It is partly in recognition of this trade that the Government has taken its interest in horse-breeding and the income which the farmers derive from the industry is an important part of their livelihood.

SUGGESTIVE WORK OF OTHER COUNTRIES.

It would be interesting to follow out the methods employed by other European countries in the way of government assistance to agricultural industries, but mention may be made of those of only one or two. During the last fifteen years the Government of Holland has taken an active interest in all matters pertaining to the manufacture of butter and cheese. Acts have been passed to regulate the industry and extend co-operation through instruction given on the farms in reference to the feeding and breeding of cattle and to the production of wholesome milk.

State schools and experiment stations have been opened and have become centres of information to those engaged in the work whether in the factory or on the farm. A system of State supervision has been inaugurated, through the agency of inspectors and control stations, with a view to improving the quality of the output, making it more uniform, and of giving to the makers the advantage of a Government guarantee in the disposal of their produce. The extent of the market and of the export trade warrants the Government in the support it gives and it would appear that, at the present time, Ireland and Holland are paralleling each other in the work they are doing in this connection.

Of Denmark, the advance this country has made in the production of bacon is well known, and the advantage that it has reaped through its trade on foreign markets. The efficiency of the Government assistance in reorganizing and recreating the bacon and dairy industries is a splendid illustration of what is really possible and of how effective such assistance may be. At the meeting of the British Association for the Advancement of Science, held in Winnipeg in 1909, the Danish Live Stock Commissioner described methods in use in Denmark which had resulted in raising the average yield of Danish cows from 80 lbs. butter in 1864, to 220 lbs. in 1908. This result has been obtained through the formation of local cattle breeders' associations, through which the bulls are purchased for use amongst the members; through a subsidy given for such bulls; through the formation of control unions which engage men to conduct tests for the farmers in connection with the milk-yield

of their cows, the percentage of butter fat and the cost of feed; and again through the giving of prizes at fairs to cows and bulls in recognition, above all else, of their merit as breeders and producers. It is a recognized fact that, compared with Canada, in the production of milk and bacon the Danes are at a disadvantage through rate of rent for land and through cost of feed. Denmark, too, is a very small country and yet she has been able to obtain the best of the argument in competition for trade with Great Britain. The enterprise of the Government in co-operation with the farmers has made this possible and an income of millions of pounds annually has consequently resulted to the country.

CONCLUSIONS.

It is obviously difficult even if we appropriate the experience of other countries to suggest or recommend a policy that will be suitable for our own. Canada, through her provincial and federal Departments of Agriculture, has now, for a number of years, been formulating and developing policies, through the undertaking of which steady and definite progress has been made. It may well seem almost a truism, however, to say that the development of this country, agriculturally, will necessitate the consideration and adoption of measures of wider scope and purpose than have been either advisable or possible in the past. The extent of the territory and the variety of the interests involved, even including only those having to do directly with live stock, creates a situation which makes a comparison with the conditions obtaining in the other countries we have been studying almost out of the question. The primary principles, nevertheless, remain about the same.

The one fact that is emphasized perhaps more forcefully than any other by the experience of foreign countries, and for that matter by our own, is that without intensive effort in a definite direction and with particular application in individual communities, any general system of education or even of demonstration is likely to prove largely inoperative. Without the enthusiastic co-operation of the people themselves, it is impossible to get results commensurate with the money expended. In observing the methods of work in Europe, nothing was impressed upon the author more forcibly than the fact that government activity had to be carried directly to the country districts and the wheels of its enterprise set in motion there before it could expect to accomplish results. Contact with the people by actual demonstration is necessary before their support and co-operation can be obtained. It is not without faith, therefore, in the aim and direction of the substance of the schemes herein set forth that they are commended for consideration and, with necessary modifications, for adoption and application to the interests of the live stock industry in Canada.

The policy, to give point to what has already been suggested, in principle and in practice, must be eminently simple. It should consist in carrying the information obtained by scientific research and practical investigation direct to the farmer, not through the avenue of lectures and addresses only, but by practical demonstration and preferably by such demonstration as the farmers themselves shall set in operation. System in research is being more and more fully perfected every year, but system in practice of the results of such research has scarcely been more than conceived.

The individual community must constitute the unit in such a system of practice. There can be no better way of effecting improvement in horse-breeding, in cattle, sheep, pig and poultry breeding than, in the beginning at least, by stimulating and directing it in individual centres. The pork packers in Ireland pursue such a policy in their purchase and distribution of Yorkshire boars. In the Eastern states, the proprietors of condensing establishments have adopted a similar system in arranging for a supply of selected dairy bulls for their patrons. That a government

is in a position to offer very great assistance in directing the practice of individual communities and of promoting co-operation amongst the members of each is unquestionable. A movement in this direction will constitute an active and powerful agency operating to counteract the evident tendency toward the merging of capital in the ownership of land, thus assisting to secure to the small holder the possession of his farm. Further, it will promote production and so develop the resources of the country as to give Canada a much larger place in the trade of the world.

United States authorities estimate that for every dollar expended in extension work there is a return of $20 to the farms. A government now need fear no embarrassment in engaging itself in the operation of such measures as have been here proposed. The utility of such work has in recent years been somewhat widely demonstrated and in concerning itself in this aggressive fashion with the important industries of the rural districts, it may be assured of the backing and support not only of the farming population but, as well, of the approval and good-will of all the great business enterprises of the country.

APPENDIX No. 19.

Forms used in connection with Aid by Department to Thoroughbred Stallions.

FORM OF APPLICATION No. 1.

THOROUGHBRED STALLIONS.

(To be filled in and signed by applicant and forwarded to Live Stock Commissioner, Ottawa, as early as possible after opening of service season.)

Name of Stallion.....Number in Can. Stud Book.....

Date of Birth.....

Bred by.....Address .....

Owned by.....Address .....

In charge of.....Address .....

Location of Stallion for season 19.....

.....

.....

I purpose to stand for public service the above named stallion at.....

.....Province of .....for the full season 19 and hereby make application for the official inspection of the said horse which, if approved, will on fulfilment of the conditions hereinafter set forth, be eligible for the special grant offered by the Department of Agriculture at Ottawa in aid of Thoroughbred horses.

1. Certificate of registration to be produced and identity of horse proven when the horse is inspected.

2. Stallion and place or places at which he will be available for service during the season to be properly and fully advertised by poster and by announcements in the local press.

3. The service fee for any mare, not being a Thoroughbred, to be not more than $10 to insure, such service fee to become due and payable only when mare proves to be in foal.

4. Evidence satisfactory to the Department to be furnished at the close of the season that the horse has served a reasonable number of mares, other than Thoroughbred mares, age of horse and district in which the season is made to be duly considered.

5. In the event of any horse being incapacitated through death, illness or accident, before the proper conclusion of his season, the Department to be at once notified and at the same time informed as to whether or not it is the intention of the owner or controller to provide an approved substitute.

(Signature of Applicant).....

Dated at.....

This.....day of..... 19.....

FORM OF APPLICATION No. 2.

(To be filled in and executed by applicant and forwarded to Live Stock Commissioner, Ottawa, upon completion of service season.)

I.. .....of .....

Owner of stallion.....Number in Canadian Stud Book.....hereby declare that the said stallion has been, during the season 19 in charge of..... of.....and has, during said season, stood for public service of mares, under the conditions usual in the district, at..... .....and that the said stallion has been duly and properly advertised, as shown by the copies of advertisements attached hereto. The fee charged for the service of mares, other than Thoroughbred mares, by the said horse has, in no case, exceeded the sum of $10 to insure.

I further declare that the horse has, during the said season served..... mares, other than Thoroughbred mares, as shown by the list attached hereto, which is true and correct in every particular.

I further declare that the season has been*..... ....

I further declare that the information herein presented is true and correct to the best of my knowledge and belief and that it accurately sets forth the facts and circumstances attending the service season of said horse.

And I make this solemn Declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act.

(Signature).....

Declared before me at the.....
of.....in the.....
.....of.....
this.....day of.....
in the year of our Lord 19.....

* Here state the general conditions of season, whether favourable or otherwise, as also any circumstances likely to have weight with the Department in deciding as to whether or not the horse shall be entitled to receive Government assistance.

APPENDIX No. 20.

REPORT No. 4 OF THE CANADIAN RECORD OF PERFORMANCE.

INTRODUCTION.

That the importance of an official record of production in breeding stock is each year becoming more generally recognized by dairymen in Canada is clearly indicated by the steady growth in the work of the Record of Performance and by the prominence which is given to R.O.P. tests in the advertisements and sale-catalogues of breeders. Owners of pure bred herds with young stock to sell are finding that the faith of the public in spectacular records made in short tests of seven or thirty days has to a certain extent been shaken and that there is an increasing demand for a more substantial evidence of merit in the ancestry of the animals selected. A certificate of qualification in the Record of Performance test covering, as it does, the production for the full milking period of a cow carrying a calf provides such evidence and, in consequence, possesses a value which the progressive dairyman cannot afford to ignore.

While this phase of the work of the Live Stock Branch is thus of very great and direct benefit to the pure bred stockmen, it has an even wider influence in furnishing to the owners of grade herds reliable and valuable information to govern the selection of bulls to place at the head of their herds. The justification of the undertaking of the work in the first place lay, in a large measure, in this fact and already there has been ample demonstration of appreciation, on the part of dairymen in general, of the advantage thus afforded. The ultimate improvement in the dairy stock of the country which will be attained as a result of this form of assistance cannot, therefore, be even estimated.

As was foreshadowed in the report of last year, the expansion of the work has necessitated the appointment of additional inspectors. Whereas, a year ago a staff of three men in the field were, under the direction of the Chief Inspector, endeavouring to keep up with the work in Ontario and Quebec, six inspectors are now devoting all of their time to the supervision of tests in these provinces and a special inspector has been appointed for the Maritime Provinces. In the Western Provinces the work has also increased but has not yet reached a point to justify the appointment of inspectors in each Province. Accordingly, as in the past, arrangements have been made through the Provincial Departments for all inspections in the Provinces of Alberta and Saskatchewan, while in British Columbia, the work, as from time to time required has been performed by an officer furnished under a special arrangement by the Dairy Commissioner of the Federal Department.

During the past year some notably high yields were recorded and previous Canadian Records, and even World's Records in different classes, were beaten. The attention attracted by these creditable performances, however, indicates a tendency on the part of the public to form a misconception of the purpose of the work . It is, therefore, perhaps opportune to emphasize the fact that the Record of Performance is not a competitive institution. Its aim is rather to develop and perpetuate high producing strains of dairy stock under normal conditions of management and feeding. The danger of sacrificing thrift and hardiness for abnormal production cannot be too strenuously guarded against by breeders.

For some time there has been a growing demand on the part of breeders that some recognition be given to cows which qualify in so far as yield in milk and butterfat

is concerned, but which fail to calve within fifteen months after the commencement of the test. In view of the fact that such records have a value as evidence of capacity for production the Minister has this year consented to the publishing of them in future in an Appendix to the Report of the Record of Performance. No certificates for records so published will, however, be issued.

The total number of cows entered, as well as the total number which have qualified in the intervals preceding the issuing of the four reports published to date is set forth in the following tables. It will be noted that the column for 1908 includes all cows entered and qualifying during the two years and a half preceding the issuing of the Report on July 1st of that year. The column for 1910 summarizes the results for a period of one year and nine months, while those for 1910 and 1911 each contain one year's figures. Since the date of calving after completing the test has a bearing on the qualification of a cow, the result of the test of all the cows entered in one interval is not known at the end of the succeeding interval and it is, consequently, not possible to determine exactly the percentage qualifying.

SUMMARY FOR PERIOD PRECEDING THE ISSUING OF EACH REPORT.

NO. OF COWS ENTERED.

	July 1, 1908.	March 31, 1910.	March 31, 1911.	March 31, 1912.
Holsteins	194	227	244	399
Ayreshires	345	227	250	301
Jerseys	11	6	52	70
Guernseys	.....	13	12	19
French Canadians	11	47	28	12
	561	520	586	801

QUALIFIED.

Holsteins	6	76	75	77
Ayrshires	37	52	52	72
Jerseys	.....	3	3	7
Guernseys	.....	.....	5	2
French Canadians	1	4	10	2
	44	135	145	160

Feed Reports.

While a low average yield per cow is undoubtedly one of the greatest drawbacks to successful dairying in Canada to-day, there is another factor influencing the final profit which should receive more attention at the hands of dairymen than it does—that of cost of production. Recognizing this fact, the Department is now utilizing its Inspectors in the Record of Performance in collecting exact information regarding the ration fed to each cow entered in the test.

Since the first of January, 1912, each inspector has been required to obtain, in so far as possible, the exact weight of each kind of feed fed during the time of his visit to each cow whose test he supervised. Using prices intended to represent an average for a term of years, the feed has been charged against the production and the cost

per cwt. of milk and per lb. of fat, in so far as the feed is concerned, worked out. The feed record is of course entirely independent of the Record of Performance and, consequently, imposes no handicap upon cows entered.

The work has not as yet been in progress long enough to justify the making of extensive deductions from the data thus obtained. That the providing of abundance of roughage of good quality and the feeding of grain in proportion to production are important factors in cheapening cost has, however, been clearly indicated by the information already secured. The influence of high yield upon the cost per cwt. has also been very evident. As an illustration of this point, the feed reports received during a period of six weeks in mid-winter for all cows giving upwards of 30 lbs. of milk per day were tabulated in four classes—cows giving 30-40 lbs., 40-50 lbs., 50-60 lbs., and upwards of 60 lbs. per day. Ayrshire, Holstein and Jersey cows of all ages and in different periods of lactation were included in the comparison. They were, moreover, representative of many different herds under widely varying conditions of management and feeding and yet when the average cost of the feed per cwt. of milk for each class was worked out it illustrated, in a striking manner, the principle that high yield is invariably associated with cheapness of production. The costs averaged as follows:—

Cows	giving	30-40	lbs.	per	day	77c.	per	cwt.
"	"	40-50	"	"	"	66c.	"	"
"	"	50-60	"	"	"	57c.	"	"
"	"	60 lbs. and up		"		51c.	"	"

The obtaining of these feed reports has naturally depended very largely upon the co-operation of the breeders and it is fitting that the cheerful manner in which this assistance has been given should be frankly acknowledged. The interest taken by the herd owners in this new feature has, in fact, exceeded the expectations of the Department and it is felt that as the investigation progresses information of great value to dairymen will result.

Rules and Regulations.

Following are the rules and regulations governing the Record of Performance tests:—

SCOPE OF TESTS.

All tests will be for a period not exceeding 365 consecutive days.

ELIGIBILITY OF ANIMALS.

All animals entered for the test must previously be registered in the Canadian Herd Book, for the breed to which they belong.

CLASSIFICATION OF ANIMALS.

Cows from 2 to 3 years old shall be in a class known as 2-year-old.
Cows from 3 to 4 years old shall be in a class known as 3-year-old.
Cows from 4 to 5 years old shall be in a class known as 4-year-old.
Cows 5 years old and over shall be in a class known as mature.

In the 4-year-old class and the mature class, no cow will be accepted for entry if the beginning of her previous lactation period was more than fifteen months before the commencement of the test. Every cow under test must drop a calf within fifteen months after the beginning of her testing period, in order to qualify for registration of performance.

No milk from a second freshening within the 365 days will be considered in a test.

DUTIES OF OWNER.

It is desirable that entries of cows for test be made before calving. Application for entry of cows will in no case be accepted if not mailed within thirty days after calving.

The owner of a cow entered in the test shall weigh, or cause to be weighed, each milking and keep a correct record of the same on forms furnished for the purpose.

At the end of each month the owner shall report on forms furnished for the purpose:—

(*a*) A record of the weights of each milking, with the total yield of milk from each cow for the month.

(*b*) An approximate statement of the amount and kinds of feed given, and data concerning stabling and care of the animals.

NOTE—Monthly reports should be mailed within ten days after each monthly period. Such reports must reach the office of the Live Stock Commissioner before the end of the succeeding month.

As soon as possible after the calving of a cow whose test has been completed, the owner shall send in on Form IV a statement compiled from the monthly reports of the year's milk record, the same having been sworn to before a Notary Public or Justice of the Peace.

The owner of a cow entered in the test shall provide board and lodging for the inspector during his official visits and shall convey him, when leaving, to the railway station, or the next farm to be visited, free of charge.

DUTIES OF INSPECTORS.

An inspector shall visit the stable at least eight times during the year, at irregular intervals and unannounced. He shall remain for at least two full days, covering all the milkings of that period, at each visit. During this time he shall weigh the milk of each cow under test, at each milking, and take samples of each for a composite sample for Babcock test. These tests shall be the basis for computing the record. He shall see that the samples are in no manner interfered with; when not under the inspector's eye the samples must be under lock and key or sealed.

The inspector shall in each case complete the test for fat before leaving for the next place to be visited and should, as far as possible, make tests in the presence of the owner or of interested parties.

The inspector may insist upon only one of the animals under the test being milked at a time during inspection.

He shall compare at each visit the owner's scale with his own and report any difference that he may observe.

The inspector shall take a copy of the owner's milk record for the two days immediately preceding his visit.

A statement of the feed fed to each cow shall be reported upon forms furnished for the purpose.

Any sickness of cows and other disturbing influences shall be noted. If such sickness of an animal should occur at the time of a visit the inspector may defer the test of this animal to another date.

The inspector must send to the Live Stock Commissioner, Ottawa, as soon as possible after each visit, a report of said visit on forms furnished for the purpose.

APPLICATION FOR TEST.

Application for the test should be made before calving and must be mailed within thirty days after calving to the secretary of the Canadian Association for the breed to which the animal belongs, and accepted by him as eligible.

Upon receipt of said application, signed by said secretary, the Live Stock Commissioner will forward to the address of the applicant blank forms and other information and arrange for official inspection.

The Dominion Department of Agriculture undertakes the supervision of these yearly tests of cows through the various breed associations. Only such cows will be tested as are of the breeds, whose respective associations have officially recognized the tests outlined, and have agreed to publish in connection with their Herd Book the records of the animals fulfilling the standards required.

A report of the performance of each animal that has qualified for registration will be forwarded to the Secretary of the Canadian Association representing the breed at the conclusion of the testing period.

The above rules and requirements are subject to change at the discretion of the Minister of Agriculture.

J. G. RUTHERFORD,
Live Stock Commissioner.

THE STANDARDS FOR REGISTRATION.

Ayrshire.

Bulls—Admitted after having four daughters in the Record of Performance, each from a different dam.

Cows—Admitted after fulfilling the following requirements of production and breeding as supervised by the Live Stock Branch of the Department of Agriculture.

All cows admitted must equal or exceed both the records specified below:—

	Lbs. Milk.	Lbs. Butter Fat.
Two-year-old class	5,500	198
Three-year-old class	6,500	234
Four-year-old class	7,500	270
Mature class	8,500	306

The per cent of butter fat shall be determined by Babcock test.

Year's Milk Record—If the test be commenced the day the animal is two years old or previous to that day, she must produce within 365 consecutive days from the date, 5,500 pounds of milk. For each day the animal is over two years old at the beginning of her year's test, the amount of milk she will be required to produce in the year will be determined by adding 2·75 pounds for each such day to the 5,500 pounds required when in the two-year-old class. This ratio is applicable until the animal is five years old, when the required amount will have reached 8,500 pounds which will be the minimum amount of milk required of all cows five years old and over.

Year's Butter Fat Record—If test be commenced the day the animal is two years old or previous to that day, she must produce within 365 consecutive days from that date, 198 pounds of butter fat. For each day the animal is over two years old at the beginning of her year's test, the amount of butter fat she will be required to produce in one year will be determined by adding ·1 (one-tenth) of a pound for each such day to the 198 pounds required when in the two-year-old class. This ratio is applicable until the animal is five years old when the required amount will have reached 306 pounds, which will be the minimum amount of butter fat required of all cows five years old and over.

Every cow accepted for registration of performance must drop a calf within fifteen months after the commencement of the test. In the four-year-old class and the mature class, no cows will be accepted for registration of performance if the beginning of her previous lactation period was more than fifteen months before the commencement of the test.

All applications for the test must be mailed to W. F. Stephen, Huntingdon, Quebec, secretary of the Canadian Ayrshire Breeders' Association.

French Canadian.

Bulls—Admitted after having four daughters in the Record of Performance, each from a different dam.

Cows—Admitted after fulfilling the following requirements of production and breeding as supervised by the Live Stock Branch of the Department of Agriculture.

All cows admitted must equal or exceed both the records specified below:—

	Lbs. Milk.	Lbs. Butter Fat.
Two-year-old class	4,400	198
Three-year-old class	5,200	234
Four-year-old class	6,000	270
Mature class	6,800	306

The per cent of butter fat shall be determined by Babcock test.

Year's Milk Record—If the test be commenced the day the animal is two years old or previous to that day, she must produce within 365 consecutive days from that date, 4,400 pounds of milk. For each day the animal is over two years old at the beginning of her year's test, the amount of milk she will be required to produce in the year will be determined by adding 2·2 pounds for each such day to the 4,400 pounds required when in the two-year-old class. This ratio is applicable until the animal is five years old, when the required amount will have reached 6,800 pounds which will be the minimum amount of milk required of all cows five years old and over.

Year's Butter Fat Record—If test be commenced the day the animal is two years old, or previous to that day, she must produce within 365 consecutive days from that date, 198 pounds of butter fat. For each day the animal is over two years old at the beginning of her year's test, the amount of butter fat she will be required to produce in one year will be determined by adding ·1 (one-tenth) of a pound for each such day to the 198 pounds required when in the two-year-old class. This ratio is applicable until the animal is five years old when the required amount will have reached 306 pounds, which will be the minimum amount of butter fat required of all cows five years old and over.

Every cow accepted for registration of performance must drop a calf within fifteen months after the commencement of the test. In the four-year-old class and the mature class, no cows will be accepted for registration of performance if the beginning of her previous lactation period was more than fifteen months before the commencement of the test.

All applications for the test must be mailed to Dr. J. A. Couture, 49 Garden St., Quebec, secretary of the French-Canadian Cattle Breeders' Association

Guernsey.

Bulls—Admitted after having four daughters in the Record of Performance, each from a different dam.

Cows—Admitted after fulfilling the following requirements of production and breeding as supervised by the Live Stock Branch of the Department of Agriculture.

All cows admitted must equal or exceed both the records specified below:—

	Lbs. Milk.	Lbs. Butter Fat
Two-year-old class	5,000	200
Three-year-old class	6,000	240
Four-year-old class	7,000	280
Mature class	8,000	320

The per cent of butter fat shall be determined by Babcock test.

Year's Milk Record—If the test be commenced the day the animal is two years old or previous to that day, she must produce within 365 consecutive days from that date, 5,000 lbs. of milk. For each day the animal is over two years old at the beginning of her year's test, the amount of milk she will be required to produce in the year will be determined by adding 2·75 lbs. for each day to the 5,000 lbs. required when in the two-year-old class. This ratio is applicable until the animal is five years old, when the required amount will have reached 8,000 lbs., which will be the minimum amount of milk required of all cows five years old or over.

Year's Butter Fat Record—If test be commenced the day the animal is two years old, or previous to that day, she must produce within 365 consecutive days from that date, 200 lbs. of butter fat. For each day the animal is over two years old at the beginning of her year's test, the amount of butter fat she will be required to produce in one year will be determined by adding ·11 (eleven one-hundredths) of a pound for each such day to the 200 lbs. required when in the two-year-old class. This ratio is applicable until the animal is five years old when the required amount will have reached 320 lbs. which will be the minimum amount of butter fat required of all cows five years old and over.

Every cow accepted for registration of performance must drop a calf within fifteen months after the commencement of the test. In the four-year-old class and the mature class, no cows will be accepted for registration of performance if the beginning of her previous lactation period was more than fifteen months before the commencement of the test.

All applications for the test must be mailed to Howard W. Corning, Chegoggin, N.S., secretary of the Canadian Guernsey Breeders' Association.

Holstein-Friesian.

Bulls—Admitted after having four daughters in the Record of Performance, each from a different dam.

Cows—Admitted after fulfilling the following requirements of production and breeding as supervised by the Live Stock Branch of the Department of Agriculture.

All cows admitted must equal or exceed both the records specified below:—

	Lbs. Milk.	Lbs. Butter Fat.
Two-year-old class	7,500	255
Three-year-old class	8,500	289
Four-year-old class	9,500	323
Mature class	10,500	357

The per cent of butter fat shall be determined by Babcock test.

Year's Milk Record—If the test be commenced the day the animal is two years old, or previous to that day, she must produce within 365 consecutive days from that date 7,500 lbs. of milk. For each day the animal is over two years old at the

beginning of her year's test, the amount of milk she will be required to produce in the year will be determined by adding 2·75 lbs. for each such day to the 7,500 lbs. required when in the two-year-old class. This ratio is applicable until the animal is five years old, when the required amount will have reached 10,500 lbs., which will be the minimum amount of milk required of all cows five years old and over.

Year's Butter Fat Record—If test be commenced the day the animal is two years old, or previous to that day, she must produce within 365 consecutive days from that date, 255 lbs. of butter fat. For each day the animal is over two years old at the beginning of her year's test, the amount of butter fat she will be required to produce in one year will be determined by adding ·0931 of a lb. for each day to the 255 lbs. required when in the two-year-old class. This ratio is applicable until the animal is five years old, when the required amount will have reached 357 lbs., which will be the minimum amount of butter fat required of all cows five years old and over.

Every cow accepted for registration of performance must drop a calf within fifteen months after the commencement of the test. In the four-year-old class and the mature class, no cows will be accepted for registration of performance if the beginning of her previous lactation period was more than fifteen months before the commencement of the test.

All applications for the test must be mailed to G. W. Clemons, St. George, Ont., secretary of the Canadian Holstein-Friesian Breeders' Association.

Jersey.

Bulls.—Admitted after having four daughters in the Record of Performance, each from a different dam.

Cows—Admitted after fulfilling the following requirements of production and breeding as supervised by the Live Stock Branch of the Department of Agriculture.

All cows admitted must equal or exceed both the records specified below:—

	Lbs. Milk.	Lbs. Butter Fat.
Two-year-old class	5,500	218
Three-year-old class	6,500	257
Four-year-old class	7,500	297
Mature class	8,500	337

The per cent of butter fat shall be determined by Babcock test.

Year's Milk Record.—If the test be commenced the day the animal is two years old, or previous to that day, she must produce within 365 consecutive days from that date, 5,500 lbs. of milk. For each day the animal is over two years old at the beginning of her year's test, the amount of milk she will be required to produce in the year will be determined by adding 2·75 lbs., for each such day to the 5,500 lbs. required when in the two-year-old class. This ratio is applicable until the animal is five years old, when the required amount will have reached 8,500 lbs., which will be the minimum amount of milk required of all cows five years old and over.

Year's Butter Fat Record—If test be commenced the day the animal is two years old or previous to that day, she must produce within 365 consecutive days from that date, 218 lbs. of butter fat. For each day the animal is over two years old at the beginning of her year's test the amount of butter fat she will be required to produce in one year will be determined by adding ·11 (eleven one hundredths) of a pound for each such day to the 218 lbs. required when in the two-year-old class. This ratio is applicable until the animal is five years old, when the required amount will have reached 337 lbs., which will be the minimum amount of butter fat required of all cows five years old and over.

Every cow accepted for registration of performance must drop a calf within fifteen months after the commencement of the test. In the four-year-old class and the mature class, no cow will be accepted for registration of performance if the beginning of her previous lactation period was more than fifteen months before the commencement of the test.

All applications for the test must be mailed to R. Reid, Berlin, Ont., secretary of the Canadian Jersey Cattle Club.

AYRSHIRE.

COWS FIVE YEARS OLD AND OVER.

Production required for registration: milk, 8,500 lbs.; fat, 306 lbs.

No. 143. '**Kirsty 3rd of Neidpath,**' No. 14559.
Sire, '**Laird O'Thorncliffe,**' No. 9982.
Dam, '**White Legged Kirsty of Auchenbrain,**' No. 2020.
Bred and owned by W. W. Ballantyne, Stratford, Ont.
Test commenced, March 10, 1910.
Age at commencement of test, 9 years.
Date of calving, March 9th, 1910.
Date of previous calving, April 14th, 1909.
Date of calving following test, April 26th, 1911.
Average per cent of fat, 3·26; days in milk, 365.
Total production, milk, 11,903·5 lbs.; fat, 388·54 lbs.

No. 149. '**Lizzie Glen of Ste. Anne's,**' No. 16147.
Sire, '**Glencairn, 3rd,**' No. 6955.
Dam, '**Lizzie 5th of Auchenbrain,**' No. 12292.
Owned by Macdonald College, Macdonald College, Que.
Bred by R. Reford, Ste. Anne de Bellevue, Que.
Test commenced, March 11, 1910.
Age at commencement of test, 7 years.
Date of calving, March 11, 1910.
Date of previous calving, December 23, 1908.
Date of calving after test, May 10, 1911.
Average per cent of fat, 4·00; days in milk, 333.
Total production, milk, 9,116 lbs.; fat, 365·29 lbs.

No. 152. '**Pet of Hickory Hill,**' No. 21259.
Sire, '**Dairyman of Glenora,**' No. 13475.
Dam, '**Flower of Hickory Hill,**' No. 12031.
Bred and owned by N. Dyment, Clappison, Ont.
Test commenced, January, 11, 1910.
Age at commencement of test, 6 years and 316 days.
Date of calving, January 1, 1910.
Date of previous calving, December 5, 1908.
Date of calving after test, March 29, 1911.
Average per cent of fat, 4·10; days in milk, 354.
Total production, milk, 13,191 lbs.; fat, 542·18 lbs.

No. 153. '**Flower of Metcalfe,**' No. 30405.
Sire, '**Neidpath Chief,**' No. 2142.
Dam, '**Flora of Metcalfe,**' No. 30257.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by Frank Inch, Kerrwood, Ont.
Test commenced, May 22, 1910.
Age at commencement of test. 8 years.
Date of calving, May 22, 1910.
Date of previous calving, April 7, 1909.
Date of calving after test, June 26, 1911.
Average per cent of fat, 4·02; days in milk, 276.
Total production, milk, 9,157·45 lbs.; fat, 368·70 lbs.

No. 154. '**Flora of Metcalfe,**' No. 30257.
Sire, '**Metcalfe Chief,**' No. 1784.
Dam, '**Flora 2nd,**' No. 3253.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by Frank Inch, Kerrwood, Ont.
Test commenced, May 6, 1910.
Age at commencement of test, 10 years.
Date of calving, May 5, 1910.
Date of previous calving, April 10, 1909.
Date of calving after test, July 1, 1911.
Average per cent of fat, 3·59; days in milk, 365.
Total production, milk, 11,908·85 lbs.; fat, 427·34 lbs.

No. 155. '**Brownie,**' No. 13188.
Sire, '**Rob Roy of Brookside,**' No. 9799.
Dam, '**Nancy,**' No. 2175.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, July 9, 1910.
Age at commencement of test, 10 years.
Date of calving, July 5, 1910.
Date of previous calving, July 2, 1909.
Date of calving after test, August 10, 1911.
Average per cent of fat, 4·15; days in milk, 330.
Total production, milk, 8,730·6 lbs.; fat, 362·31 lbs.

No. 156. '**Lady Cairn,**' No. 14428.
Sire, '**Prince Cairn,**' No. 10500.
Dam, '**Lady Cameron,**' No. 1740.
Owned by Wm. Thorn, Lynedock, Ont.
Bred by F. T. Guy, Darlington, Ont.
Test commenced, April 8, 1910.
Age at commencement of test, 8 years.
Date of calving, March 30, 1910.
Date of previous calving, April 25, 1909.
Date of calving after test, June 15, 1911.
Average per cent of fat, 3·55; days in milk, 307.
Total production, milk, 9,051·55 lbs.; fat, 322·25 lbs.

No. 159. '**May Beauty,**' No. 12400.
Sire, '**White Prince 2nd,**' No. 808.
Dam, '**Queen May,**' No. 2815 .
Owned by Wm. Stewart & Son, Menie, Ont.

Bred by J. H. Douglas, Warkworth, Ont.
Test commenced, April 16, 1910.
Age at commencement of test, 11 years.
Date of calving, April 13, 1910.
Date of previous calving, April 1, 1909.
Date of calving after test, April, 1911.
Average per cent of fat, 3·88; days in milk, 321.
Total production, milk, 9,580 lbs.; fat, 372·24 lbs.

No. 164. '**Mabel,**' No. 12768.
Sire, '**Marquis of Neidpath,**' No. 2031.
Dam, '**Lady Douglas,**' No. 2165.
Owned by Jas. Begg, St. Thomas, Ont.
Bred by John Crosby, Campbellford, Ont.
Test commenced, March 2, 1910.
Age at commencement of test, 10 years.
Date of calving, March 1, 1910.
Date of previous calving, March 1, 1909.
Date of calving after test, May 11, 1911.
Average per cent of fat, 3·86; days in milk, 365.
Total production, milk, 8,872·75 lbs.; fat, 342·90 lbs.

No. 171. '**Dairymaid,**' No. 13847.
Sire, '**Caspian of Ste. Anne's,**' No. 8893.
Dam, '**Dairymaid's Maid,**' No. 3445.
Owned by H. C. Hamill, Box Grove, Ont.
Bred by A. Hume & Co., Menie, Ont.
Test commenced, March 1, 1910.
Age at commencement of test, 9 years.
Date of calving, February 28, 1910.
Date of previous calving, January 15, 1909.
Date of calving after test, April 8, 1911.
Average per cent of fat, 3·72; days in milk, 321.
Total production, milk, 8,968 lbs.; fat, 333·97 lbs.

No. 172. '**Sarah of Brookside,**' No. 17842.
Sire, '**Bobs,**' No. 13187.
Dam, '**Sarah 2nd,**' No. 13192.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, October 7, 1910.
Age at commencement of test, 6 years and 335 days.
Date of calving, October 3, 1910.
Date of previous calving, September 24, 1909.
Date of calving after test, November 9, 1911.
Average per cent of fat, 4·00; days in milk, 314.
Total production, milk, 9,711 lbs.; fat, 388·88 lbs.

No. 173. '**Annie of Warkwork,**' No. 21493.
Sire, '**Jack of Warkworth,**' No. 15790.
Dam, '**Ida of Warkworth,**' No. 15707.
Owned by Alex. Hume & Co., Menie, Ont.
Bred by John H. Douglas, Warkworth, Ont.
Test commenced, November 24, 1910.
Age at commencement of test, 5 years and 310 days.
Date of calving, November 22, 1910.

Date of previous calving, September 1, 1909.
Date of calving after test, November 7, 1911.
Average per cent of fat, 4·16; days in milk, 275.
Total production, milk, 9,383·5 lbs.; fat, 390·99 lbs.

No. 176. '**Daisy 1st of Brookside,**' No. 13785.
Sire, '**Rob Roy of Brookside,**' No. 9799.
Dam, '**Sprightly,**' No. 13193.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, November 18, 1910.
Age at commencement of test, 10 years.
Date of calving, November 14, 1910.
Date of previous calving, November 13, 1909.
Date of calving after test, November 22nd, 1911.
Average per cent of fat, 4·14; days in milk, 284.
Total production, milk, 8,533·2 lbs.; fat, 353·00 lbs.

No. 182. '**Daisy 4th of Neidpath,**' No. 17937.
Sire, '**Royal Peter of Ste. Anne's,**' No. 13140.
Dam, '**Daisy 1st of Auchenbrain,**' No. 2023.
Bred and owned by W. W. Ballantyne, Stratford, Ont.
Test commenced, October 13, 1910.
Age at commencement of test, 7 years and 263 days.
Date of calving, October 12, 1910.
Date of previous calving, October 9, 1909.
Date of calving after test, December 17, 1911.
Average per cent of fat, 4·11; days in milk, 365.
Total production, milk, 9,889·7 lbs.; fat, 406·41 lbs.

No. 187. '**Dairymaid,**' No. 24702.
Sire, '**Jock Marsfield,**' No. 2434.
Dam, '**Annie Laurie,**' No. 2602.
Owned by And. McRae & Sons, East Royalty, P.E.I.
Bred by Wm. Miller, Marshfield, P.E.I.
Test commenced, November 1, 1910.
Age at commencement of test, 6 years.
Date of calving, October 22, 1910.
Date of previous calving, August 16, 1909.
Date of calving after test, December 11, 1911.
Average per cent of fat, 5·16; days in milk, 365.
Total production, milk, 11,100 lbs; fat, 572·77 lbs.

No. 190. '**Snowflake,**' No. 19739.
Sire, '**Glenora Sultan,**' No. 10338.
Dam, '**Helena,**' No. 3356.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by Jas. McCormick & Son, Rockton, Ont.
Test commenced, December 6, 1910.
Age at commencement of test, 9 years and 233 days.
Date of calving, December 5, 1910.
Date of previous calving, October 10, 1909.
Date of calving after test, December 27, 1911.
Average per cent of fat, 4·41; days in milk, 299.
Total production, milk, 12,616·1 lbs.; fat, 556·79 lbs.

No. 195. '**Star's Alpha,**' No. 17839.
Sire, '**Royal Star of Ste. Anne's,**' No. 7916.
Dam, '**Daisy 1st of Brookside,**' No. 13785.
Owned by E. Cohoon, Harrietsville, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, February 11, 1910.
Age at commencement of test, 6 years and 139 days.
Date of calving, February 10, 1910.
Date of previous calving, January 22, 1909.
Date of calving after test, March 10, 1911.
Average per cent of fat, 3·94; days in milk, 308.
Total production, milk, 9,305·6 lbs.; fat, 366·50 lbs.

No. 202. '**Buttercup,**' No. 24187.
Sire, '**Sultan of the Willows,**' No. 15310.
Dam, '**Primrose 9th,**' No. 3012.
Owned by W. J. Carlyle, Chesterville, Ont.
Bred by John Campbell, Dalmeny, Ont.
Test commenced, March 24, 1911.
Age at commencement of test, 7 years.
Date of calving, March 22, 1911.
Date of previous calving, February 25, 1910.
Date of calving after test, March 3, 1912.
Average per cent of fat, 3·60; days in milk, 283.
Total production, milk, 10,623 lbs.; fat, 382·79 lbs.

No. 205. '**Eileen,**' No. 18220.
Sire, '**Gladstone 2nd,**' No. 9225.
Dam, '**Dorcas,**' No. 11568.
Owned by G. D. Mode, Vankleek Hill, Ont.
Bred by Wm. Grier, Ormstown, Que.
Test commenced, November 24, 1910.
Age at commencement of test, 8 years.
Date of calving, November 21, 1910.
Date of previous calving, September 16, 1909.
Date of calving after test, February 19, 1912.
Average per cent of fat, 4·59; days in milk, 365.
Total production, milk, 13,825·75 lbs.; fat, 635·48 lbs.

No. 206. '**Sybella of Springbank,**' No. 27691.
Sire, '**Hamilton Chief,**' No. 17491.
Dam, "**Lady White of Springbank,**' No. 27690.
Bred and Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Test commenced, March 21, 1911.
Age at commencement of test, 5 years and 212 days.
Date of calving, March 20, 1911.
Date of previous calving, January 1, 1910.
Date of calving after test, March 13, 1912.
Average per cent of fat, 3·74; days in milk, 307.
Total production, milk, 11,468·8 lbs.; fat, 428·68 lbs.

No. 207. '**Alice of Kerwood,**' No. 30387.
Sire, '**Neidpath Chief,**' No. 2142.
Dam, '**Alice of Byron,**' No. 485.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by Frank Inch, Kerrwood, Ont.

Test commenced, April 24, 1911.
Age at commencement of test, 7 years and 39 days.
Date of calving, April 23, 1911.
Date of previous calving, March 8, 1910.
Date of calving after test, March 9, 1912.
Average per cent of fat, 3·95; days in milk, 283.
Total production, milk, 10,030·7 lbs.; fat, 396·36 lbs.

No. 211. '**Wexfard Blood**,' No. 16720.
Sire, '**Dan of Auchenbrain**,' No. 3959.
Dam, '**Wexford Miss Wallace**,' No. 418.
Owned by Macdonald College, Macdonald College, Que.
Bred by Robt. Taylor, Symington, Scotland.
Test commenced, December 23, 1910.
Age at commencement of test, 9 years.
Date of calving, December 22, 1910.
Date of previous calving, December 3, 1909.
Date of calving after test, March 22, 1912.
Average per cent of fat, 4·1; days in milk, 337.
Total production, milk, 9,719·50 lbs.; fat, 402·75 lbs.

No. 212. '**Rose of Senneville**,' No. 20376.
Sire, '**The Don**,' No. 8855.
Dam, '**Red Rose of Senneville**,' No. 12027.
Owned by Geo. H. Montgomery, Philipsburg, Que.
Bred by R. B. Angus, Senneville, Que.
Test commenced, January 9, 1911.
Age at commencement of test, 7 years.
Date of calving, January 7, 1911.
Date of previous calving, December 24, 1909.
Date of calving after test, February 28, 1912.
Average per cent of fat, 3·82; days in milk, 356.
Total production, milk, 10,144·5 lbs.; fat, 394·28 lbs.

COWS FOUR YEARS OLD AND UNDER FIVE.

No. 147. '**Julia**,' No. 23580.
Sire, '**Major**,' No. 23467.
Dam, '**Sprightly of Tanglewyld**,' No. 17883.
Bred and owned by Wooddisse Bros., Rothsay, Ont.
Test commenced, April 7, 1910.
Age at commencement of test, 4 years and 155 days.
Date of calving, April 7, 1910.
Date of previous calving, March 18, 1909.
Date of calving after test, May 17, 1911.
Average per cent of fat, 4·82; days in milk, 365.
Total production, milk, 9,753·25 lbs.; fat, 470·31 lbs.
Production required for registration—milk, 7,926·25 lbs.; fat, 285·5 lbs.

No. 150. '**Daisy**,' No. 23582.
Sire, '**McCormack**,' No. 15944.
Dam, '**White Rose of Tanglewyld**,' No. 17884.
Bred and owned by Wooddisse Bros., Rothsay, Ont.
Test commenced, March 2, 1910.
Age at commencement of test, 4 years and 132 days.

Date of calving, March 1, 1910.
Date of previous calving, February 11, 1909.
Date of calving after test, March 3, 1911.
Average per cent of fat, 4·24; days in milk, 300.
Total production, milk, 8,679 lbs.; fat, 367·93 lbs.
Production required for registration—milk, 7,863 lbs.; fat, 283·2 lbs.

No. 151. '**Maud of Hillview,**' No. 23671.
Sire, '**Champion of Beaver Meadow,**' No. 14519.
Dam, '**Laura of Hillview,**' No. 20279.
Owned by W. J. Carlyle, Chesterville, Ont.
Bred by Carlyle Bros., Morewood, Ont.
Test commenced, April 8, 1910.
Age at commencement of test, 4 years and 26 days.
Date of calving, April 6, 1910.
Date of previous calving, April 10, 1909.
Date of calving after test, May 18, 1911.
Average per cent of fat, 3·69; days in milk, 327.
Total production, milk, 9,028 lbs.; fat, 333·5 lbs.
Production required for registration—milk, 7,571·5 lbs.; fat, 272·6 lbs.

No. 180. '**Scotland Princess 2nd,**' No. 23495.
Sire, '**Polar Star,**' No. 16118.
Dam, '**Annie Laurie,**' No. 2492.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by W. M. Smith, Scotland, Ont.
Test commenced, July 22, 1910.
Age at commencement of test, 4 years and 192 days.
Date of calving, July 22, 1910.
Date of previous calving, August 4, 1909.
Date of calving after test, October 7, 1911.
Average per cent of fat, 4·48; days in milk, 365.
Total production, milk, 11,385·95 lbs.; fat, 511·97 lbs.
Production required for registration—milk, 8,028 lbs; fat, 289·2 lbs.

No. 199. '**Scottie's Sarah**' No. 21870.
Sire, '**Scottie,**' No. 19712.
Dam, '**Sarah 2nd,**' No. 13192.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, March 6, 1911.
Age at commencement of test, 4 years and 112 days.
Date of calving, March 2, 1911.
Date of previous calving, December 25, 1909.
Date of calving after test, February 8, 1912.
Average per cent of fat, 3·7; days in milk, 280.
Total production, milk, 9,364·6 lbs.; fat, 348·04 lbs.
Production required for registration—milk, 7,808 lbs.; fat, 281·2 lbs.

No. 200. '**Guy's Red Rose 2nd,**' No. 29792.
Sire, '**Toga's Heir of Nether Lea,**' No. 21501.
Dam, '**Guy's Red Rose,**' No. 29790.
Owned by A. H. Trimble & Sons, Red Deer, Alta.
Bred by F. J. Guy, Darlington, Ont.
Test commenced, December 1, 1910.
Age at commencement of test, 4 years and 4 days.

Date of calving, November 28, 1910.
Date of previous calving, January 29, 1910.
Date of calving after test, January 23, 1912.
Average per cent of fat, 4·52; days in milk, 355.
Total production, milk, 9,043·8 lbs.; fat, 409·16 lbs.
Production required for registration—milk, 7,511 lbs.; fat, 270·4 lbs.

No. 201. '**Rena,**' No. 27709.
Sire, '**Reliance of Ste. Anne's,**' No. 21804.
Dam, '**Sally,**' No. 19607.
Owned by W. J. Carlyle, Chesterville, Ont.
Bred by H. J. Whitteker & Sons, Williamsburg, Ont.
Test commenced, April 21, 1911.
Age at commencement of test, 4 years.
Date of calving, April 21, 1911.
Date of previous calving, April 16, 1910.
Date of calving after test, February 26, 1912.
Average per cent of fat, 3·8; days in milk, 270.
Total production, milk, 8,711 lbs.; fat, 332·53 lbs.
Production required for registration—milk, 7,500 lbs.; fat, 270 lbs.

No. 210. '**Kirsty of Ste. Anne's,**' No. 25968
Sire, '**Howie's Fizzaway,**' No. 16721.
Dam, '**Kirsty Wallace of Auchenbrain,**' No. 8301.
Bred and owned by Macdonald College, Macdonald College, Que.
Test commenced, February 8, 1911.
Age at commencement of test, 4 years and 334 days.
Date of calving, February 8, 1911.
Date of previous calving, January 20, 1910.
Date of calving after test, March 26, 1912.
Average per cent of fat, 3·65; days in milk, 358.
Total production, milk, 9,150·75 lbs.; fat, 334·43 lbs.
Production required for registration—milk, 7,413 lbs.; fat, 303·2 lbs.

COWS THREE YEARS OLD AND UNDER FOUR.

No. 145. '**Flavia 2nd of Ottawa,**' No. 22197.
Sire, '**Reliance of Woodroffe,**' No. 18747.
Dam, '**Flavia,**' No. 16502.
Bred and owned by the Director of Experimental Farms, Ottawa.
Test commenced, November 1, 1909.
Age at commencement of test, 3 years and 330 days.
Date of calving, October 28, 1909.
Date of previous calving, October 16, 1908.
Date of calving after test, January 6, 1911.
Average per cent of fat, 4·14; days in milk, 331.
Total production, milk, 8,413·5 lbs.; fat, 348·53 lbs.
Production required for registration—milk, 8,407·5 lbs.; fat, 303 lbs.

No. 148. '**Madge,**' No. 27700.
Sire, '**Major,**' No. 23467.
Dam, '**Bonnie Doon,**' No. 19437.
Bred and owned by Wooddisse Bros., Rothsay, Ont.
Test commenced, April 4, 1910.
Age at commencement of test, 3 years and 110 days.

Date of calving, April 3, 1910.
Date of previous calving, February 16, 1909.
Date of calving after test, May 15, 1911.
Average per cent of fat, 4·58; days in milk, 320.
Total production, milk, 7,271 lbs.; fat, 333·24 lbs.
Production required for registration—milk, 6,802·5 lbs; fat, 245 lbs.

No. 163. '**Stony Croft Lady Helen,**' No. 25225.
Sire, '**Barcheskie May King,**' No. 5685.
Dam, '**Old Graitney Trim 4th,**' No. 22702.
Owned by Alex. Hume & Co., Menie, Ont.
Bred by Andrew Mitchell, Barcheskie, Scotland.
Test commenced, August 27, 1910.
Age at commencement of test, 3 years and 340 days.
Date of calving, August 26, 1910.
Date of previous calving, August 16, 1909.
Date of calving after test, August 26, 1911.
Average per cent of fat, 4·17; days in milk, 302.
Total production, milk, 8,602 lbs.; fat, 358·96 lbs.
Production required for registration—milk, 7,435 lbs.; fat, 268 lbs.

No. 166. '**Flower of Sardis,**' No. 26539.
Sire, '**Royal Peter of Ste. Anne's,**' No. 13140.
Dam, '**Woodroffe Dairymaid,**' No. 3437.
Owned by Jos. Thompson, Sardis, B.C
Bred by Geo. E. Knight, Sardis, B.C.
Test commenced, October 8, 1910.
Age at commencement of test, 3 years and 32 days.
Date of calving, October 8, 1910.
Date of previous calving, July 20, 1909.
Date of calving after test, October 7, 1911.
Average per cent of fat, 3·66; days in milk, 323.
Total production, milk, 6,760·25 lbs.; fat, 247·52 lbs.
Production required for registration—milk, 6,588 lbs.; fat, 237 lbs

No. 160. '**Dewdrop of Menie,**' No. 25875.
Sire, '**Rob Roy,**' No. 14584.
Dam, '**Scotland's Best of Dentonia,**' No. 13672.
Bred and owned by Wm. Stewart & Son, Menie, Ont.
Test commenced, August 10, 1910.
Age at commencement of test, 3 years and 10 days.
Date of calving, August 10, 1910.
Date of calving after test, July 15, 1911.
Average per cent of fat, 4·10; days in milk, 295.
Total production, milk, 9,783 lbs.; fat, 401·46 lbs.
Production required for registration—milk, 6,527·5 lbs.; fat, 235 lbs.

No. 161. '**Lass O'Gowrie**', No. 25190.
Sire, '**Rob Roy,**' No. 14584.
Dam, '**Jessie Blair Stewart of Menie,**' No. 14549.
Bred and owned by Wm. Stewart & Son, Menie, Ont.
Test commenced, May 17, 1910.
Age at commencement of test, 3 years and 24 days.
Date of calving, May 15, 1910.
Date of calving after test, May 7, 1911.
Average per cent of fat, 4·04; days in milk, 333.

Total production, milk, 6,896·5 lbs.; fat, 279·16 lbs.
Production required for registration—milk, 6,566 lbs.; fat, 236·4 lbs.

No. 174. '**Dairy Miss,**' No. 24722.
Sire, '**Dainty Lad of Elmshade,**' No. 2245.
Dam, '**Dairy Maid,**' No. 24702.
Owned by Andrew McRae, East Royalty, P.E.I.
Bred by Wm. Miller, Marshfield, P.E.I.
Test commenced, September 25, 1910.
Age at commencement of test, 3 years and 222 days.
Date of calving, September 18, 1910.
Date of previous calving, September 26, 1909.
Date of calving after test, November 14, 1911.
Average per cent of fat, 4·17; days in milk, 365.
Total production, milk, 7,631 lbs.; fat, 318·21 lbs.
Production required for registration—milk, 7,100 lbs.; fat, 256·2 lbs.

No. 177. '**Coquette of Lakeside,**' No. 26685.
Sire, "**Jock of Maple Hill,**' No. 18660.
Dam, '**Garclaugh Enchantress,**' No. 16761.
Bred and owned by G. H. Montgomery, Philipsburg, Que.
Test commenced, September 2, 1910.
Age at commencement of test, 3 years and 74 days.
Date of calving, September 1, 1910.
Date of previous calving, August 1909.
Date of calving after test, October 8, 1911.
Average per cent of fat, 3·97; days in milk, 350.
Total production, milk, 7,609·5 lbs.; fat, 303·18 lbs.
Production required for registration—milk, 6,703·5 lbs.; fat, 241·4 lbs.

No. 173. '**Barcheskie Derby 6th,**' No. 28548.
Sire, '**McQuittiston Secretary,**' No. 28679.
Dam, '**Derby 4th of Barcheskie,**' No. 14382.
Owned by Geo. H. Montgomery, Philipsburg, Que.
Bred by And. Mitchell, Barcheskie, Scotland.
Test commenced, September 28, 1910.
Age at commencement of test, 3 years and 184 days.
Date of calving, September 24, 1910.
Date of calving after test, November 6, 1911.
Average per cent of fat, 4·10; days in milk, 337.
Total production, milk, 7,206 lbs.; fat, 296·22 lbs.
Production required for registration—milk, 7,006 lbs.; fat, 252·4 lbs.

No. 181. '**Grace,**' No. 27602.
Sire, '**Nissouri Pride,**' No. 23888.
Dam, '**Red Rose of Sunny Springs,**' No. 15640.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by D. A. James, Nilestown, Ont.
Test commenced, August 23, 1910.
Age at commencement of test, 3 years and 153 days.
Date of calving, August 22, 1910.
Date of calving after test, August 26, 1911.
Average per cent of fat, 3·9; days in milk, 302.
Total production, milk, 7,721·9 lbs.; fat, 301·85 lbs.
Production required for registration—milk, 6,920·75 lbs.; fat, 249·3 lbs

No. 183. '**Scottie's Victoria,**' No. 23675.
Sire, '**Scottie,**' No. 19718.
Dam, '**Victoria,**' No. 13788.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, November 30, 1910.
Age at commencement of test, 3 years and 332 days.
Date of calving, November 26, 1910.
Date of previous calving, August 15, 1909.
Date of calving after test, December 20, 1911.
Average per cent of fat, 3·87; days in milk, 314.
Total production, milk, 10,057·5 lbs.; fat, 389·56 lbs.
Production required for registration—milk, 7,413 lbs.; fat, 267 lbs.

No. 186. '**Scottie's Dandy 2nd,**' No. 25690.
Sire, '**Scottie,**' No. 19718.
Dam, "**Dandy 1st of Brookside,**' No. 13786.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, November 7, 1910.
Age at commencement of test, 3 years and 9 days.
Date of calving, November 3, 1910.
Date of calving after test, December 26, 1911.
Average per cent of fat, 3·96; days in milk, 293.
Total production, milk, 7,317·9 lbs.; fat, 289·78 lbs.
Production required for registration—milk, 6,524·75 lbs.; fat, 234·9 lbs.

No. 189. '**Jemima of Springbank 2nd,**' No. 29618.
Sire, '**Hamilton Chief,**' No. 17491.
Dam, '**Jemima,**' No. 27688.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by A. S. Turner, Ryckman's Corners, Ont.
Test commenced, February 27, 1911.
Age at commencement of test, 3 years and 160 days.
Date of calving, February 27, 1911.
Date of calving after test, January 1, 1912.
Average per cent of fat, 3·77; days in milk, 243.
Total production, milk, 8,265·05 lbs.; fat, 311·99 lbs.
Production required for registration—milk, 6,940 lbs.; fat, 250 lbs.

No. 194. '**College Merry Maid,**' No. 28776.
Sire, "**Lessnessock Royal Monarch,**' No. 24424.
Dam, '**Triple X of Dentonia,**' No. 18822.
Owned by Nova Scotia Agricultural College, Truro, N.S.
Bred by Alex. Hume & Co., Menie, Ont.
Test commenced, November 1, 1910.
Age at commencement of test, 3 years and 47 days.
Date of calving, November 1, 1910.
Date of previous calving, November 28, 1909.
Date of calving after test, January 15, 1912.
Average per cent of fat, 3·08; days in milk, 365.
Total production, milk, 8,371·75 lbs.; fat, 321·62 lbs.
Production required for registration—milk, 6,629·2 lbs.; fat, 234·5 lbs.

No. 197. '**Lady Minto 2nd,**' No. 24159.
Sire, '**Reliance of Ste. Anne's,**' No. 21800.
Dam, '**Lady Minto,**' No. 10134.

Owned by W. J. Carlyle, Chesterville, Ont.
Bred by H. J. Whittcker & Sons, Williamsburg, Ont.
Test commenced, February 7, 1911.
Age at commencement of test, 3 years and 313 days.
Date of calving, February 3, 1911.
Date of calving after test, January 27, 1912.
Average per cent of fat, 4·16; days in milk, 390.
Total production, milk, 7,716·6 lbs.; fat, 321·01 lbs.
Production required for registration—milk, 7,360·75 lbs.; fat, 265·3 lbs.

No. 198. '**Oddity,**' No. 27699.
Sire, '**Miller o'the Dee,**' No. 10422.
Dam, '**Little Queen 3rd,**' No. 13570.
Bred and owned by Wooddisse Bros., Rothsay, Ont.
Test commenced, November 19, 1910.
Age at commencement of test, 3 years and 141 days.
Date of calving, November 17, 1910.
Date of previous calving, August 17, 1909.
Date of calving after test, January 18, 1912.
Average per cent of fat, 4·24; days in milk, 365.
Total production, milk, 9,030·25 lbs.; fat, 383·62 lbs.
Production required for registration—milk, 6,887·75 lbs.; fat, 248·4 lbs.

No. 204. '**Mabel of Riverside,**' No. 26320.
Sire, '**Barcheskie Raymond,**' No. 21358.
Dam, '**Lady Basham,**' No. 6406.
Owned by G. D. Mode, Vankleek Hill, Ont.
Bred by Jas. Cottingham, Ormstown, Que.
Test commenced, October 12, 1910.
Age at commencement of test, 3 years and 154 days.
Date of calving, October 12, 1910.
Date of calving after test, December 9, 1911.
Average per cent of fat, 3·98; days in milk, 365.
Total production, milk, 9,432 lbs.; fat, 375·54 lbs.
Production required for registration—milk, 6,923·5 lbs.; fat, 249·4 lbs.

COWS TWO YEARS OLD AND UNDER THREE.

No. 142. '**Annie Laurie 3rd,**' No. 27957.
Sire, '**Scottie,**' No. 19718. R. of P. No. 5.
Dam, '**Annie Laurie 2nd,**' No. 15588. R. of P. No. 83.
Owned by W. W. Ballantyne, Stratford, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, March 20, 1910.
Age at commencement of test, 2 years and 135 days.
Date of calving, March 17, 1910.
Date of calving after test, April 23, 1911.
Average per cent of fat, 3·68; days in milk, 365.
Total production, milk, 7,728·6 lbs.; fat, 284·93 lbs.
Production required for registration—milk, 5,871·25 lbs.; fat, 211·5 lbs.

No. 144. '**Scottie's White Wings,**' No. 24266.
Sire, '**Scottie,**' No. 19718. R. of P. No. 5.
Dam, '**White Wings,**' No. 9304.
Bred and owned by H. & J. McKee, Norwich, Ont.

Test commenced, March 14th, 1910.
Age at commencement of test, 2 years and 338 days.
Date of calving, March 10, 1910.
Date of calving after test, April 27, 1911.
Average per cent of fat, 3·56; days in milk, 328.
Total production, milk, 6,933·7 lbs.; fat, 247·38 lbs.
Production required for registration—milk, 6,430 lbs.; fat, 231 lbs

No. 146. '**Ottawa Kate,**' No. 29601.
Sire, '**Admiral Togo,**' No. 28201.
Dam, '**Yellow Kate 1st of Auchenbrain,**' No. 14343.
Bred and owned by the Director of Experimental Farms, Ottawa.
Test commenced, October 5, 1909.
Age at commencement of test, 2 years and 307 days.
Date of calving, October 4, 1909.
Date of calving after test, December 23, 1910.
Average per cent of fat, 3·76; days in milk, 365.
Total production, milk, 9,017 lbs.; fat, 339·45 lbs.
Production required for registration—milk, 6,344 lbs.; fat, 228 lbs.

No. 157. '**Holehouse Flirt of Trout Run,**' No. 27033.
Sire, '**Holehouse Pilot,**' No. 22596.
Dam, '**Polly,**' No. 2637.
Bred and owned by Wm. Thorn, Lynedock, Ont.
Test commenced, May 4, 1910.
Age at commencement of test, 2 years and 262 days.
Date of calving, May 4, 1910.
Date of calving after test, July 12, 1911.
Average per cent of fat, 4·21; days in milk, 365.
Total production, milk, 10,298·5 lbs.; fat, 433·72 lbs.
Production required for registration—milk, 6,220·5 lbs.; fat, 224·2 lbs.

No. 158. '**Lessnessock Sprightly,**' No. 26345.
Sire, '**Dalfibble Stylish Boy,**' No. 6295.
Dam, '**Dalfibble Sprightly 2nd,**' No. 15867.
Owned by Alex. Hume & Co., Menie, Ont.
Bred by John Mackie, Dumfries, Scotland.
Test commenced, August 15, 1910.
Age at commencement of test, 2 years and 209 days.
Date of calving, August 12, 1910.
Date of calving after test, August 2, 1911.
Average per cent of fat, 3·51; days in milk, 322.
Total production, milk, 7,405 lbs; fat, 260·35 lbs.
Production required for registration—milk, 6,074·75 lbs.; fat, 218·9 lbs

No. 162. '**Milkmaid 7th,**' No. 28769.
Sire, '**Dainty Lad of Elm Shade,**' No. 2245.
Dam, '**Milkmaid 4th,**' No. 12374.
Owned by Andrew McRae, East Royalty, P.E.I.
Bred by Wm. Miller, Marshfield, P.E.I.
Test commenced, August 3, 1910.
Age at commencement of test, 2 years and 344 days.
Date of calving, July 26, 1910.
Date of calving after test, September 17, 1911.
Average per cent of fat, 4·22; days in milk, 365.
Total production, milk, 11,673·5 lbs.; fat, 492·75 lbs.
Production required for registration—milk, 6,446 lbs.; fat, 232·4 lbs.

No. 165. '**Long Legget Kirsty,**' No. 26541.
Sire, '**Rob Roy,**' No. 14584.
Dam, **Brownie of Menie,**' No. 11632.
Bred and owned by Wm. Stewart & Son, Menie, Ont.
Test commenced, June 1, 1910.
Age at commencement of test, 2 years and 10 days.
Date of calving, June 1, 1910.
Date of calving after test, May 3, 1911.
Average per cent of fat, 4·16; days in milk, 345.
Total production, milk, 6,602 lbs.; fat, 265·18 lbs.
Production required for registration—milk, 5,527·5 lbs.; fat, 199 lbs.

No. 167. '**Fairview Lassie,**' No. 26531.
Sire, '**Bessie's Mangus,**' No. 23833.
Dam, '**Fairy Lass,**' No. 21829.
Bred and owned by Jos. Thompson, Sardis, B.C.
Test commenced, September 12, 1910.
Age at commencement of test, 2 years and 176 days.
Date of calving, September 9, 1910.
Date of calving after test, September 30, 1911.
Average per cent of fat, 3·65; days in milk, 353.
Total production, milk, 10,464 lbs.; fat, 381·74 lbs.
Production required for registration—milk, 5,989·5 lbs.; fat, 215·8 lbs.

No. 168. '**Fairview Nora,**' No. 26532.
Sire, '**Bessie's Mangus,**' No. 23833.
Dam, '**Glenora Stately,**' No. 11425.
Bred and owned by Jos. Thompson, Sardis, B.C.
Test commenced, September 13, 1910.
Age at commencement of test, 2 years and 156 days.
Date of calving, September 11, 1910.
Date of calving after test, September 29, 1911.
Average per cent of fat, 3·95; days in milk, 313.
Total production, milk, 6,972·5 lbs.; fat, 275·91 lbs.
Production required for registration—milk, 5,929 lbs.; fat, 213·6 lbs.

No. 169. '**New Year,**' No. 29577.
Sire, '**Ivanhoe of Springhill,**' No. 19596.
Dam, '**Daisy,**' No. 23582.
Bred and owned by Wooddisse Bros., Rothsay, Ont.
Test commenced, July 7, 1910.
Age at commencement of test, 2 years and 188 days.
Date of calving, July 7, 1910.
Date of calving after test, August 24, 1911.
Average per cent of fat, 4·7; days in milk, 365.
Total production, milk, 7,445·5 lbs.; fat, 350·10 lbs.
Production required for registration—milk, 6,017 lbs.; fat, 216·8 lbs.

No. 170. '**Nola of Craigielea,**' No. 29803.
Sire, '**Aberdeen,**' No. 16917.
Dam, '**Nola of Ingleside,**' No. 20477.
Bred and owned by H. C. Hamill, Box Grove, Ont.
Test commenced, August 14, 1910.
Age at commencement of test, 2 years and 176 days.
Date of calving, August 12, 1910.
Date of calving after test, October 2, 1911.

Average per cent of fat, 4·05; days in milk, 337.
Total production, milk, 6,092·25 lbs.; fat, 247·20 lbs.
Production required for registration—milk, 5,984 lbs.; fat, 216·6 lbs.

No. 175. '**Mollie Bawn**,' No. 28376.
Sire, '**Belevidere Prince**,' No. 26166.
Dam, '**Lily Queen**,' No. 28373.
Owned by And. McRae & Sons, East Royalty, P.E.I.
Bred by Provincial Farm, Charlottetown, P.E.I.
Test commenced, September 28, 1910.
Age at commencement of test, 2 years and 100 days.
Date of calving, September 27, 1910.
Date of calving after test, November 4, 1911.
Average per cent of fat, 4·00; days in milk, 365.
Total production, milk, 5,919·75 lbs.; fat, 236·30 lbs.
Production required for registration—milk, 5,775 lbs.; fat, 208 lbs.

No. 179. '**Ayrshire Beauty of Trout Run**,' No. 27034.
Sire, '**Holehouse Pilot**,' No. 22596.
Dam, '**Empress Augusta of Trout Run**,' No. 19849.
Bred and owned by Wm. Thorn, Lynedock, Ont.
Test commenced, July 4, 1910.
Age at commencement of test, 2 years and 50 days.
Date of calving, July 3, 1910.
Date of calving after test, September 15, 1911.
Average per cent of fat, 3·91; days in milk, 365.
Total production, milk, 8,008·45 lbs.; fat, 313·24 lbs.
Production required for registration—milk, 5,637·5 lbs.; fat, 203 lbs.

No. 184. '**Burnside Pearl 4th**,' No. 27181.
Sire, '**Barcheskie King's Own**,' No. 20726.
Dam, '**Lady Pearl of Burnside**,' No. 13467. R. of P. No. 17.
Bred and owned by R. R. Ness, Howick, Que.
Test commenced, October 8, 1910.
Age at commencement of test, 2 years and 300 days.
Date of calving, October 6, 1910.
Date of calving after test, August 30, 1911.
Average per cent of fat, 3·93; days in milk, 292.
Total production, milk, 6,471 lbs.; fat, 254·419 lbs.
Production required for registration—milk, 6,325 lbs.; fat, 228 lbs.

No. 185. '**Burnside Silver Bell**,' No. 34664.
Sire, '**Bargeoch Baron Winter**,' No. 71682.
Dam, '**Bargenoch Silver Bell**,' No. 30852.
Owned by R. R. Ness, Howick, Que.
Bred by M. Logan, Drongan, Scotland.
Test commenced, October 13, 1910.
Age at commencement of test, 2 years and 282 days.
Date of calving, October 11, 1910.
Date of calving after test, October 2, 1911.
Average per cent of fat, 4·04; days in milk, 287.
Total production, milk, 6,487·75 lbs.; fat, 262·62 lbs.
Production required for registration—milk, 6,275 lbs.; fat, 226·2 lbs.

No. 188. '**Helena of Springbank**,' No. 30215.
Sire, '**Burnside Heather King**,' No. 23653.
Dam, '**Helena**,' No. 3356.

Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by Jas. McCormick, Rockton, Ont.
Test commenced, February 14, 1911.
Age at commencement of test, 2 years and 302 days.
Date of calving, February 14, 1911.
Date of calving after test, January 6, 1912.
Average per cent of fat, 4·11; days in milk, 289.
Total production, milk, 6,764·55 lbs.; fat, 278·01 lbs.
Production required for registration—milk, 6,330·5 lbs.; fat, 228·2 lbs.

No. 191. '**Lessnessock Queen Bee,**' No. 30581.
Sire, '**Barrowmoss Swell,**' No. 6408.
Dam, '**Hillhouse Queen Bee 4th,**' No. 17598.
Owned by Robt. Hunter & Sons, Maxville, Ont.
Bred by Robt. McKinlay, Hillhouse, Scotland.
Test commenced, September 1, 1910.
Age at commencement of test, 2 years and 168 days.
Date of calving, August 28, 1910.
Date of calving after test, August 25, 1911.
Average per cent of fat, 3·94; days in milk, 303.
Total production, milk, 6,163 lbs.; fat, 243·44 lbs.
Production required for registration—milk, 5,962 lbs.; fat, 214·8 lbs.

No. 192. '**Scottie's Victoria 2nd,**' No. 25906.
Sire, '**Scottie,**' No. 19718. R. of P. No. 5.
Dam, '**Victoria,**' No. 13788.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, October 22, 1910.
Age at commencement of test, 2 years and 341 days.
Date of calving, October 18, 1910.
Date of calving after test, January 13, 1912.
Average per cent of fat, 3·86; days in milk, 365.
Total production, milk, 8,359·9 lbs.; fat, 322·82 lbs.
Production required for registration—milk, 6,437·75 lbs.; fat, 232 lbs.

No. 193. '**Ravensdale Flirt,**' No. 26652.
Sire, '**Bright Star of Glenora,**' No. 16293.
Dam, '**Isaleigh Flora,**' No. 16198.
Bred and owned by W. F. Kay, Philipsburg, Que.
Test commenced, December 19, 1910.
Age at commencement of test, 2 years and 264 days.
Date of calving, December 15, 1910.
Date of calving after test, December 28, 1911.
Average per cent of fat, 3·859; days in milk, 317.
Total production, milk, 6,672 lbs.; fat, 257·47 lbs.
Production required for registration—milk, 6,226 lbs.; fat, 224·4 lbs.

No. 196. '**Christmas Belle,**' No. 25958.
Sire, '**Royal Peter of Neidpath,**' No. 16138.
Dam, '**Adalia 2nd,**' No. 22949.
Bred and owned by E. Cohoon, Harrietsville, Ont.
Test commenced, June 26, 1909.
Age at commencement of test, 2 years and 180 days.
Date of calving, June 26, 1909.
Date of calving after test, July 9, 1910.

Average per cent of fat, 3·46; days in milk, 330.
Total production, milk, 7,684·9 lbs.; fat, 265·67 lbs.
Production required for registration—milk, 5,995 lbs.; fat, 216 lbs.

No. 203. **'Scottie's Nancy 2nd,'** No. 27253.
Sire, **'Scottie,'** No. 19718. R. of P. No. 5.
Dam, **'Nancy 2nd,'** No. 19780.
Owned by John McKee, Norwich, Ont.
Bred by H. & J. McKee, Norwich, Ont.
Test commenced, February 4, 1911.
Age at commencement of test, 2 years and 310 days.
Date of calving, January 31, 1911.
Date of calving after test, March 5, 1912.
Average per cent of fat, 4·10; days in milk, 295.
Total production, milk, 8,387·4 lbs.; fat, 343·56 lbs.
Production required for registration—milk, 6,352·5 lbs.; fat, 229 lbs.

No. 208. **'Briery 2nd of Springbank,"** No. 32137.
Sire, **'St. Peter,'** No. 23366.
Dam, **'Briery of Springbank,'** No. 29616.
Bred and owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Test commenced, January 1, 1911.
Age at commencement of test, 2 years and 198 days.
Date of calving, January 1, 1911.
Date of calving after test, March 7, 1912.
Average per cent of fat, 3·68; days in milk, 365.
Total production, milk, 14,131·35 lbs.; fat, 520·49 lbs.
Production required for registration—milk, 6,044·5 lbs.; fat, 217·8 lbs.

No. 209. **'Butter Maid of Craiglea,'** No. 29940.
Sire, **'Woodroffe Comrade,'** No. 23029.
Dam, **'Peach of Ingleside,'** No. 24330.
Owned by A. S. Turner & Son, Ryckman's Corners, Ont.
Bred by H. C. Hamill, Box Grove, Ont.
Test commenced, January 9, 1911.
Age at commencement of test, 2 years and 174 days.
Date of calving, January 8, 1911.
Date of calving after test, March 7, 1912.
Average per cent of fat, 4·21; days in milk, 365.
Total production, milk, 11,392·45 lbs.; fat, 480·33 lbs.
Production required for registration—milk, 5,978·5 lbs.; fat, 215·4 lbs.

No. 213. **'Queen of Meadowvale,'** No. 26982.
Sire, **'First Choice of Springvale,'** No. 14313.
Dam, **'Lady of Elm View,'** No. 20976.
Owned by N. S. Agricultural College, Truro, N.S.
Bred by Sam'l. A. Porter, Deerfield, N.S.
Test commenced, January 1, 1911.
Age at commencement of test, 2 years and 122 days.
Date of calving, December 17, 1910.
Date of calving after test, March 16, 1912.
Average per cent of fat, 3·84; days in milk, 362.
Total production, milk, 6,176·75 lbs.; fat, 237·55 lbs.
Production required for registration—milk, 5,835·5 lbs.; fat, 210·2 lbs.

FRENCH CANADIAN.

COWS TWO YEARS OLD AND UNDER THREE.

No. 15. '**Winnie,**' No. 1844.
Sire, '**Nonpareil,**' No. 1230.
Dam, '**Lyster I,**' No. 1242.
Bred and owned by C. N. Lyster, Kirkdale, Que.
Test commenced, November 1, 1910.
Age at commencement of test, 2 years and 10 days.
Date of calving, October 31, 1910.
Date of calving after test, January 1, 1912.
Average per cent of fat, 4·67; days in milk, 365.
Total production, milk, 5,293·81 lbs.; fat, 247·63 lbs.
Production required for registration—milk, 4,422 lbs.; fat, 199 lbs.

No. 16. '**Jane,**' No. 1843.
Sire, '**Nonpareil,**' No. 1230.
Dam, '**Lyster II,**' No. 1235.
Bred and owned by C. N. Lyster, Kirkdale, Que.
Test commenced, December 21, 1910.
Age at commencement of test, 2 years and 64 days.
Date of calving, December 21, 1910.
Date of calving after test, February 14, 1912.
Average per cent of fat, 4·62; days in milk, 365.
Total production, milk, 4,977·69 lbs.; fat, 230·26 lbs.
Production required for registration—milk, 4,540·8 lbs.; fat, 204·4 lbs.

GUERNSEY.

COWS TWO YEARS OLD AND UNDER THREE.

No. 6. '**Dona Clatina,**' No. 172.
Sire, '**Ottawa's Beautiful Masher,**' No. 10050. A.G.C.C.
Dam, '**Queen Clatina,**' No. 16414. A.G.C.C.
Bred and owned by the Director of Experimental Farms, Ottawa.
Test commenced, September 6, 1909.
Age at commencement of test, 2 years and 245 days.
Date of calving, September 5, 1909.
Date of calving after test, September 14, 1910.
Average per cent of fat, 5·47; days in milk, 360.
Total production, milk, 6,096·5 lbs.; fat, 333·53 lbs.
Production required for registration—milk, 5,674 lbs.; fat, 227 lbs.

No. 7. '**Dairy Queen of Hillside,**' No. 123.
Sire, '**Pilate of Hillside,**' No. 62.
Dam, '**Colombine of Eastview,**' No. 17994. A.G.C.C.
Bred and owned by Howard W. Corning, Chegoggin, N.S.

Test commenced, April 17, 1910.
Age at commencement of test, 2 years and 74 days.
Date of calving, April 15, 1910.
Date of calving after test, April 20, 1911.
Average per cent of fat, 5·34; days in milk, 319.
Total production, milk, 5,447 lbs.; fat, 291·15 lbs.
Production required for registration—milk, 5,203 lbs.; fat, 208 lbs.

HOLSTEIN FRIESIAN.

COWS FIVE YEARS OLD AND OVER.

Production required for registration: milk, 10,500 lbs.; fat, 357 lbs.

No. 158. '**Aaggie DeKol Witzyde,**' No. 6440.
Sire, '**DeKol Artis Witzyde,**' No. 1602.
Dam, '**Netherland Aaggie,**' No. 2478.
Owned by J. M. VanPatter, Aylmer, Ont., R.F.D. No. 1.
Bred by J. M. Van Patter, Aylmer, Ont., R.L.D. No. 1.
Test commenced, January 31, 1910.
Age at commencement of test, 6 years.
Date of calving, January 30, 1910.
Date of previous calving, March 1, 1909.
Date of calving after test, April 3, 1911.
Average per cent of fat, 3·25; days in milk, 335.
Total production, milk, 13,709·75 lbs.; fat, 446·79 lbs.

No. 166. '**Patsy 4th's Axie DeKol,**' No. 9739.
Sire, '**Axie's Prince Pietertje DeKol,**' No. 2548.
Dam, '**Patsy 4th,**' No. 3407.
Owned by Thos. Hartley, Downsview, Ont.
Bred by R. S. Stevenson, Ancaster, Ont.
Test commenced, February 9, 1910.
Age at commencement of test, 6 years.
Date of calving, February 9, 1910.
Date of previous calving, December 7, 1908.
Date of calving after test, April 12, 1911.
Average per cent of fat, 3·37; days in milk, 315.
Total production, milk, 13,446·56 lbs.; fat, 453·33 lbs.

No. 172. '**Amy Peep 3rd.**' No. 5513.
Sire, '**Waldorf DeKol Hengerveld,**' No. 20300. H.F.H.B.
Dam, '**Amy Peep,**' No. 41740. H.F.H.B.
Owned by J. W. McCormick, Morewood Ont.
Bred by estate of Henry Wisler, Columbia, Penn., U.S.A.
Test commenced, March 18, 1910.
Age at commencement of test, 7 years.
Date of calving, March 17, 1910.
Date of previous calving, April 6, 1909.
Date of calving after test, April 21, 1911.
Average per cent of fat, 3·46; days in milk, 365.
Total production, milk, 13,607·05 lbs.; fat, 471·89 lbs.

No. 174. '**Georgie,**' No. 5742.
Sire, '**Sir Mantel Mechthilde,**' No. 3604.
Dam, '**Aliene DeKol,**' No. 3776.
Bred and owned by J. B. Arnold, Easton's Corners, Ont.
Test commenced, March, 12, 1910.
Age at commencement of test, 5 years.
Date of calving, March 10, 1910.
Date of previous calving, February 15, 1909.
Date of calving after test, May 8, 1911.
Average per cent of fat, 3·21; days in milk, 341.
Total production, milk, 12,299·27 lbs.; fat, 393·74 lbs.

No. 175. '**May DeKol,**' No. 4343.
Sire, '**Paul Edna DeKol,**' No. 1795.
Dam, '**Witzyde Queen,**' No. 2011.
Owned by J. B. Arnold, Easton's Corners, Ont.
Bred by C. Hawks, Smith's Falls, Ont.
Test commenced, March 11, 1910.
Age at commencement of test, 7 years.
Date of calving, March 7, 1910.
Date of previous calving, March 5, 1909.
Date of calving after test, June 2, 1911.
Average per cent of fat, 3·28; days in milk, 363.
Total production, milk, 13,588·05 lbs.; fat, 445·66 lbs.

No. 176. '**Rooker's Jongste Tensen,**' No. 4075.
Sire, '**Lady Tensen's Sir Rooker,**' No. 1538.
Dam, '**Jongste Aagje's Tirania Daisy of Minster,**' No. 2476.
Bred and owned by R. Honey, Brickley, Ont.
Test commenced, March 27, 1910.
Age at commencement of test, 8 years.
Date of calving, March 26, 1910.
Date of previous calving, April 16, 1909.
Date of calving after test, May 19, 1911.
Average per cent of fat, 3·19; days in milk, 365.
Total production, milk, 12,950·25 lbs.; fat, 414·042 lbs.

No. 180. '**Hengerveld Docia,**' No. 5512.
Sire, '**Brookside Hengerveld Paul,**' No. 26029. H.F.H.B.
Dam, '**Annie Clothilde Docia 2nd,**' No. 43059. H.F.H.B.
Owned by J. W. McCormick, Morewood, Ont.
Bred by estate of Henry Wisler, Columbia, Penn., U.S.A.
Test commenced, June 4, 1910.
Age at commencement of test, 7 years.
Date of calving, June 4, 1910.
Date of previous calving, June 20, 1909.
Date of calving after test, June 4, 1911.
Average per cent of fat, 3·72; days in milk, 330.
Total production, milk, 10,708·56 lbs.; fat, 397·52 lbs.

No. 186. '**Mercedes Jewel,**' No. 6219.
Sire, '**Count Cornelius,**' No. 3144.
Dam, '**Homestead Mercena,**' No. 4678.
Owned by Monro & Lawless, Thorold, Ont.
Bred by J. W. Cohoe, New Durham, Ont.
Test commenced, May 17, 1910.

Age at commencement of test, 5 years.
Date of calving, May 16, 1910.
Date of previous calving, April 16, 1909.
Date of calving after test, June 25, 1911.
Average per cent of fat, 3·25; days in milk, 287.
Total production, milk, 11,751·4 lbs; fat, 382·79 lbs.

No. 188. '**Rose of Alnwick,**' No. 4435.
Sire, '**Lady Tensen's Sir Rooker,**' No. 1538.
Dam, '**Rice Lake Belle,**' No. 1907.
Owned by J. S. Honey, Cherrywood, Ont.
Bred by Robt. Campbell, Roseneath, Ont.
Test commenced, April 1, 1910.
Age at commencement of test, 9 years.
Date of calving, March 25, 1910.
Date of previous calving, February 12, 1909.
Date of calving after test, June 12, 1911.
Average per cent of fat, 3·16; days in milk, 365.
Total production, milk, 12,639·6 lbs.; fat, 399·8 lbs.

No. 189. '**Helena Pieterje's Pauline,**' No. 4374.
Sire, '**Panarista Pauline's DeKol King,**' No. 2104.
Dam, '**Helena Pietertje,**' No. 2922.
Owned by S. J. Foster, Bloomfield, Ont.
Bred by A. D. Foster, Holloway, Ont.
Test commenced, March 1, 1910.
Age at commencement of test, 7 years.
Date of calving, February 26, 1910.
Date of previous calving, March 20, 1909.
Date of calving after test, April 9, 1911.
Average per cent of fat 3·04; days in milk, 337.
Total production, milk, 17,555·62 lbs.; fat, 534·489 lbs.

No. 191. '**Sadie Queen,**' No. 4390.
Sire, '**Korndyke Queen's Butter Boy,**' No. 1666.
Dam, '**Flora Grace Mechthilde,**' No. 3895.
Owned by S. J. Foster, Bloomfield, Ont.
Bred by G. W. Countryman, Tweed, Ont.
Test commenced May 15, 1910.
Age at commencement of test, 7 years.
Date of calving, May 12, 1910.
Date of previous calving, July 10, 1909.
Date of calving after test, May 3, 1911.
Average per cent of fat, 3·27; days in milk, 322.
Total production, milk, 13,395·25 lbs.; fat, 439·107 lbs.

No. 196. '**Jean F. DeKol,**' No. 5480.
Sire, '**Charley,**' No. 2127.
Dam, '**Fredesrinda,**' No. 2706.
Owned by S. G. Carlyle, Chesterville, Ont.
Bred by Jos. Reid, Reid's Mills, Ont.
Test commenced, August 4, 1910.
Age at commencement of test, 6 years.
Date of calving, August 3, 1910.
Date of previous calving, July 13, 1910.

Date of calving after test, August 2, 1911.
Average per cent of fat, 3·34; days in milk, 362.
Total production, milk, 15,654·6 lbs.; fat, 523·646 lbs.

No. 198. '**Kate Castleton,**' No. 4512.
Sire, '**Sir Pledge DeKol,**' No. 1295.
Dam, '**Kate Claxton,**' No. 1100.
Owned by F. S. Passmore, Brantford, Ont. (Box 241).
Bred by Ontario Agricultural College, Guelph, Ont.
Test commenced, September 21, 1910.
Age at commencement of test, 7 years.
Date of calving, September 19, 1910.
Date of previous calving, August 4, 1909.
Date of calving after test, October 31, 1911.
Average per cent of fat, 3·10; days in milk, 365.
Total production, milk, 18,713·5 lbs.; fat, 580·586 lbs.

No. 203. '**May Echo,**' No. 3372.
Sire, '**Count Echo DeKol,**' No. 1465.
Dam, '**Rosa May,**' No. 2235.
Owned by F. R. Mallory, Frankford, Ont.
Bred by B. Mallory, Frankford, Ont.
Test commenced, March 21, 1910.
Age at commencement of test, 9 years and 101 days.
Date of calving, March 20, 1910.
Date of previous calving, February 2, 1909.
Date of calving after test, May 9, 1911.
Average per cent of fat, 3·51; days in milk, 365.
Total production, milk, 23,707 lbs; fat, 833·645 lbs.

No. 209. '**Pauline Aaggie DeKol II,**' No. 5889.
Sire, '**Sir Pietertje Posch's Son,**' No. 2949.
Dam, '**Pauline Aaggie DeKol,**' No. 3688.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, February 20, 1911.
Age at commencement of test, 5 years.
Date of calving, February 20, 1911.
Date of previous calving, April 6, 1910.
Date of calving after test, February 23, 1912.
Average per cent of fat, 3·7; days in milk, 357.
Total production, milk, 11,647·43 lbs.; fat, 436·8 lbs.

No. 215. '**Alice Neilson,**' No. 4222.
Sire, '**Count Mink Mercedes,**' No. 221.
Dam, '**Kaatje De Boer 3rd,**' No. 1822.
Owned by S. Lemon, Lynden, Ont.
Bred by G. W. Clemons, St. George, Ont.
Test commenced, November 11, 1910.
Age at commencement of test, 8 years.
Date of calving, November 6, 1910.
Date of previous calving, September 28, 1909.
Date of calving following test, November 8, 1911.
Average per cent of fat, 3·37; days in milk, 300.
Total production, milk 10,731·18 lbs.; fat, 361·17 lbs.

No. 216. '**Sevangeline 2nd,**' No. 4340.
Sire, '**Judge Patrick DeKol,**' No. 1862.
Dam, '**Sevangeline,**' No. 1996.
Owned by S. Lemon, Lynden, Ont.
Bred by Alfred Rice, Curries, Ont.
Test commenced, December 29, 1910.
Age of commencement of test, 8 years.
Date of calving, December 27, 1910.
Date of previous calving, December 29, 1909.
Date of calving after test, January 12, 1912.
Average per cent of fat, 3·8; days in milk, 313.
Total production, milk, 11,362·7 lbs.; fat, 436·59 lbs.

COWS FOUR YEARS OLD AND UNDER FIVE.

No. 162. '**Irene Fairmont,**' No. 6858.
Sire, '**Fairmont Albino Paul,**' No. 2588.
Dam, '**Isabella,**' No. 1990.
Owned by F. I. Burrill, Holbrook, Ont.
Bred by Edward Hughes, Zenda, Ont.
Test commenced, March 30, 1910.
Age at commencement of test, 4 years and 176 days.
Date of calving, March 28, 1910.
Date of previous calving, April 18, 1909.
Date of calving after test, May 25, 1911.
Average per cent of fat, 3·07; days in milk, 335.
Total production, milk, 13,690·36 lbs.; fat, 420·56 lbs.
Production required for registration—milk, 9,984 lbs.; fat, 340 lbs.

No. 165. '**Bess DeKol,**' No. 6738.
Sire, '**Sir Schuiling DeKol,**' No. 3073.
Dam, '**Black Bess,**' No. 4178.
Owned by John C. Brown, Stamford, Ont.
Bred by M. Hartley, Norwich, Ont.
Test commenced, March 22, 1910.
Age at commencement of test, 4 years and 350 days.
Date of calving, March 18, 1910.
Date of previous calving, January 29, 1909.
Date of calving after test, March 27, 1911.
Average per cent of fat, 3·08; days in milk, 265.
Total production, milk, 14,101·75 lbs.; fat, 435·37 lbs.
Production required for registration—milk, 10,462·5 lbs.; fat, 355·55 lbs.

No. 183. '**Julia Posch Abbekerk,**' No. 7911.
Sire, '**Sir Schuiling DeKol,**' No. 3073.
Dam, '**Julia Abbekerk Posch 3rd,**' No. 4983.
Owned by Monro & Lawless, Thorold, Ont.
Bred by W. A. Hartley, New Durham, Ont.
Test commenced, May 18, 1910.
Age at commencement of test, 4 years and 36 days.
Date of calving, May 17, 1910.
Date of previous calving, June 2, 1909.
Date of calving after test, June 18, 1911.
Average per cent of fat, 3·35; days in milk, 323.
Total production, milk, 11,241·2 lbs.; fat, 377·09 lbs.
Production required for registration—milk, 9,599 lbs.; fat, 356·5 lbs.

No. 185. '**Agatha Houwtje DeKol,**' No. 7968.
Sire, '**Sir Houwtje B. Pietertje,**' No. 4814.
Dam, '**Sylvan Agatha,**' No. 5104.
Owned by Monro & Lawless, Thorold, Ont.
Bred by H. E. George, Crampton, Ont.
Test commenced, June 22, 1910.
Age at commencement of test, 4 years and 25 days.
Date of calving, June 20, 1910.
Date of previous calving, June 14, 1909.
Date of calving after test, July 20, 1911.
Average per cent of fat, 3·23; days in milk, 365.
Total production, milk, 12,576·8 lbs.; fat, 406·61 lbs.
Production required for registration—milk, 9,588·75 lbs.; fat, 325·3 lbs .

No. 190. '**Daisy Pauline Pietertje,**' No. 7042.
Sire, '**Rosa Bell Victor,**' No. 2897.
Dam, '**Helena Pietertje's Pauline,**' No. 4374.
Owned by S. J. Foster, Bloomfield, Ont.
Bred by B. E. Hagerman, Minto, Ont.
Test commenced, April 1, 1910.
Age at commencement of test, 4 years and 31 days.
Date of calving, March 30, 1910.
Date of previous calving, April 1, 1909.
Date of calving following test, March 31, 1911.
Average per cent of fat, 3·19; days in milk, 306.
Total production, milk, 15,158·62 lbs.; fat, 494·80 lbs.
Production required for registration—milk, 9,585·25 lbs.; fat, 325·88 lbs.

No. 200. '**Nellie's Pet,**' No. 7489.
Sire, '**Prince Pauline DeKol 10th,**' No. 3072.
Dam, '**Charming Nellie,**' No. 4772.
Owned by Tig. Wood, Mitchell, Ont.
Bred by Elias Pannabecker, Hespeler, Ont.
Test commenced, January 2, 1911.
Age at commencement of test, 4 years and 170 days.
Date of calving, January 2, 1911.
Date of previous calving, January 3, 1910.
Date of calving after test, December 3, 1911.
Average per cent of fat, 3·32; days in milk, 289.
Total production, milk, 12,677 lbs.; fat, 421·03 lbs.
Production required for registration—milk, 9,967·5 lbs.; fat, 338·8 lbs.

No. 206. '**Aaggie DeKol,**' No. 7928.
Sire, '**Manor Korndyke Wayne,**' No. 4208.
Dam, '**Pauline Aaggie DeKol,**' No. 3688.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, January 6, 1911.
Age at commencement of test, 4 years and 252 days.
Date of calving, January 5, 1911.
Date of previous calving, October 10, 1910.
Date of calving after test, February 24, 1912.
Average per cent of fat, 3·91; days in milk, 338.
Total production, milk, 13,119·37 lbs.; fat, 513·54 lbs.
Production required for registration—milk, 10,193 lbs.; fat, 346·4 lbs.

No. 212. '**Fancy B. Posch,**' No. 8428.
Sire, '**Sir Belle DeKol Posch,**' No. 3350.
Dam, '**Fancy B.,**' No. 3402.
Owned by Richard Clark, Henfryn, Ont.
Bred by J. H. Patten, Paris, Ont.
Test commenced, April 15, 1911.
Age at commencement of test, 4 years and 14 days.
Date of calving, April 12, 1911.
Date of previous calving, May 6, 1910.
Date of calving after test, February 21, 1912.
Average per cent of fat, 3·9; days in milk, 275.
Total production, milk, 10,403·06 lbs.; fat, 411·32 lbs.
Production required for registration—milk, 9,538·5 lbs.; fat, 336 lbs.

No. 220. '**Tillie Acema,**' No. 6775.
Sire, '**Jack Horner,**' No. 2752.
Dam, '**Lady Aaggie's Acme,**' No. 3049.
Owned by H. J. Allison, Chesterville, Ont.
Bred by R. O. Morrow, Hilton, Ont.
Test commenced, April 17, 1910.
Age at commencement of test, 4 years and 337 days.
Date of calving, April 14, 1910.
Date of previous calving, April 9, 1909.
Date of calving after test, June 4, 1911.
Average per cent of fat, 3·33; days in milk, 365.
Total production, milk, 12,666·6 lbs.; fat, 429·3 lbs.
Production required for registration—milk, 10,426·75 lbs.; fat, 354·37 lbs.

No. 221. '**Quora 4th,**' No. 6372.
Sire, '**Sir Wilfrid DeKol,**' No. 2118.
Dam, '**Quora 2nd,**' No. 2057.
Owned by H. J. Allison, Chesterville, Ont.
Bred by Joseph Fletcher, Oxford Mills, Ont.
Test commenced, July 3, 1910.
Age at commencement of test, 4 years, 422 days.
Date of calving, July 3, 1910.
Date of previous calving, May 2, 1909.
Date of calving after test, August 8, 1911.
Average per cent of fat, 3·01; days in milk, 328.
Total production, milk, 14,850 lbs.; fat, 447·87 lbs.
Production required for registration—milk, 10,385·5 lbs.; fat, 352·9 lbs.

No. 222. '**Rideau Pietertje DeKol,**' No. 8594.
Sire, '**Sir Pietertje Posch De Boer,**' No. 3362.
Dame, '**Rideau Dellah Princess De Kol,**' No. 4612.
Owned by C. Duff. Nelles, Boston, Ont.
Bred by Matt. Richardson, Caledonia, Ont.
Test commenced, February 20, 1911.
Age at commencement of test, 4 years and 38 days.
Date of calving, February 18, 1911.
Date of previous calving, March 21, 1910.
Date of calving after test, February 28, 1912.
Average per cent of fat, 3·25; days in milk, 303.
Total production, milk, 12,144·1 lbs.; fat, 395·55 lbs.
Production required for registration—milk, 9,604·5 lbs.; fat, 358·37 lbs.

No. 229. '**Princess Netherland Pride,**' No. 17025.
Sire, '**DeKol Barrington Prince,**' No. 3067.
Dam, '**Netherland's Pride,**' No. 3573.
Owned by J. W. McCormick, Morewood, Ont.
Bred by M. H. Black, Morewood, Ont.
Test commenced, March 12, 1911.
Age at commencement of test, 4 years and 337 days.
Date of calving, March 10, 1911.
Date of previous calving, May 1, 1910.
Date of calving after test, March 19, 1912.
Average per cent of fat, 3·45; days in milk, 337.
Total production, milk, 11,758·25 lbs.; fat, 406·42 lbs.
Production required for registration—milk, 10,423 lbs.; fat, 331 lbs.

No. 232. '**Fanny Iosco Pride,**' No. 7686.
Sire, '**Iosco Pride's Pan Am,**' No. 2420.
Dam, '**Fanny Pietertje,**' No. 3573.
Owned by Thos. Hartley, Downsview, Ont.
Bred by A. E. Hulet, Norwich, Ont.
Test commenced, September 1, 1910.
Age at commencement of test, 4 years and 168 days.
Date of calving, August 29, 1910.
Date of previous calving, July 9, 1909.
Date of calving after test, November 29, 1911.
Average per cent of fat, 3·41; days in milk, 362.
Total production, milk, 12,273·8 lbs.; fat, 419·7 lbs.
Production required for registration—milk, 9,962 lbs.; fat, 338·6 lbs.

COWS THREE YEARS OLD AND UNDER FOUR.

No. 159. '**Aaggie Mercedes,**' No. 7667.
Sire, '**Count Cornelius,**' No. 3144.
Dam, '**Netherland Aaggie,**' No. 2478.
Bred and Owned by J. M. VanPatter, Aylmer, Ont., R.F.D. No. 1.
Test commenced, February 24, 1910.
Age at commencement of test, 3 years and 54 days.
Date of calving, February 23, 1909.
Date of previous calving, January 1, 1909.
Date of calving after test, April 7, 1911.
Average per cent of fat, 3·53; days in milk, 365.
Total production, milk, 13,443·75 lbs.; fat, 475·56 lbs.
Production required for registration—milk, 8,648·5 lbs.; fat, 294 lbs.

No. 163. '**Dandy DeKol Isabella,**' No. 7695.
Sire, '**Dandy DeKol's Duke,**' No. 3209.
Dam, '**Isabella,**' No. 1990.
Owned by F. I. Burrill, Holbrook, Ont.
Bred by Arthur Thomas, Zenda, Ont.
Test commenced, March 19, 1910.
Age at commencement of test, 3 years and 116 days.
Date of calving, March 14, 1910.
Date of previous calving, March 8, 1909.
Date of calving after test, April 22, 1911.
Average per cent of fat, 2·88; days in milk, 332.
Total production, milk, 9,783·95 lbs.; fat, 281·60 lbs.
Production required for registration—milk, 8,819 lbs.; fat, 267·8 lbs.

No. 169. '**Fancy B. Posch,**' No. 8428.
Sire, '**Sir Belle DeKol Posch,**' No. 3805.
Dam, '**Fancy B.,**' No. 3402.
Owned by R. Clarke, Henfryn, Ont.
Bred by J. H. Patten, Paris, Ont.
Test commenced, May 10, 1910.
Age at commencement of test, 3 years and 40 days.
Date of calving, May 6, 1910.
Date of previous calving, April 1, 1909.
Date of calving after test, April 12, 1911.
Average per cent of fat, 3·91; days in milk, 264.
Total production, milk, 9,145·75 lbs.; fat, 357·82 lbs.
Production required for registration—milk, 8,610 lbs.; fat, 292·7 lbs.

No. 173. '**Desta,**' No. 8082.
Sire, '**Sir Mantel Mechthilde,**' No. 3604.
Dam, '**Lusina Jemima DeKol,**' No. 6670.
Bred and owned by J. B. Arnold, Easton's Corners, Ont.
Test commenced, March 7, 1910.
Age at commencement of test, 3 years and 252 days.
Date of calving, March 4, 1910.
Date of previous calving, December 24, 1908.
Date of calving after test, May 26, 1911.
Average per cent of fat, 2·99; days in milk, 365.
Total production, milk, 18,993·39 lbs.; fat, 568·32 lbs.
Production required for registration—milk, 9,193 lbs.; fat, 312·5 lbs.

No. 179. '**Princess Susie of Malahide,**' No. 8085.
Sire, '**Sir Paul Holland,**' No. 3592.
Dam, '**Sarah Queen of Middleton,**' No. 5033.
Owned by E. Laidlaw & Sons, Aylmer West, Ont.
Bred by Chas. H. Crossett, Tillsonburg, Ont.
Test commenced, May 3, 1910.
Age at commencement of test, 3 years and 338 days.
Date of calving, May 2, 1910.
Date of previous calving, April 4, 1909.
Date of calving after test, May 10, 1911.
Average per cent of fat, 3·57; days in milk, 302.
Total production, milk 12,167 lbs.; fat, 434·75 lbs.
Production required for registration—milk, 9,429·5 lbs.; fat, 320 lbs.

No. 181. '**Brooklands Korndyke Wayne,**' No. 9517.
Sire, '**Manor Korndyke Wayne,**' No. 4208.
Dam, '**Brookland's Sadie,**' No. 5514.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, June 9, 1910.
Age at commencement of test, 3 years and 64 days.
Date of calving, June 9, 1910.
Date of previous calving, June 17, 1909.
Date of calving after test, August 17, 1911.
Average per cent of fat, 3·54; days in milk, 365.
Total production, milk, 11,545·68 lbs.; fat, 408·77 lbs.
Production required for registration—milk, 8,676 lbs.; fat, 295 lbs.

No. 184. '**Pontiac Lula,**' No. 9853.
Sire, '**Pontiac Hermas,**' No. 5442.

Dam, '**Sylvan Agatha,**' No. 5104.
Owned by Monro & Lawless, Thorold, Ont.
Bred by H. G. George, Crampton, Ont.
Test commenced, May 4, 1910.
Age at commencement of test, 3 years and 5 days.
Date of calving, May 1, 1910.
Date of calving after test, May 12, 1911.
Average per cent of fat, 3·16; days in milk, 335.
Total production, milk, 11,882 lbs.; fat, 376·47 lbs.
Production required for registration—milk, 8,513·75 lbs.; fat, 293·6 lbs.

No. 202. '**Niagara Maid,**' No. 9353.
Sire, '**Count Mercena Posch,**' No. 3902.
Dam, '**Ferndale Maid,**' No. 6952.
Owned by John C. Brown, Stamford, Ont.
Bred by Jas. Rettie, Norwich, Ont.
Test commenced, October 6, 1910.
Age at commencement of test, 3 years and 48 days.
Date of calving, October 5, 1910.
Date of previous calving, May 22, 1909.
Date of calving after test, December 12, 1911.
Average per cent of fat, 3·74; days in milk, 365.
Total production, milk, 13,650 lbs.; fat, 511·31 lbs.
Production required for registration—milk, 8,632 lbs.; fat, 293·5 lbs.

No. 208. '**Korndyke Pauline DeKol,**' No. 9320.
Sire, '**Manor Korndyke Wayne,**' No. 4208.
Dam, '**Pauline Aaggie DeKol 2nd,**' No. 5889.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, March 3, 1911.
Age at commencement of test, 3 years and 327 days.
Date of calving, March 1, 1911.
Date of previous calving, April 27, 1910.
Date of calving after test, February 21, 1912.
Average per cent of fat, 3·7; days in milk, 347.
Total production, milk, 9,501·37 lbs.; fat, 357·46 lbs.
Production required for registration—milk, 9,399·25 lbs.; fat, 319·44 lbs.

No. 213. '**Korndyke DeKol Daisy,**' No. 10317.
Sire, '**Korndyke Lilly DeKol,**' No. 3265.
Dam, '**Daisy of Meadowlane,**' No. 6337.
Owned by R. Clarke, Henfryn, Ont.
Bred by B. Mallory, Belleville, Ont.
Test commenced, March 24, 1911.
Age at commencement of test, 3 years and 25 days.
Date of calving, March 23, 1911.
Date of previous calving, February 22, 1910.
Date of calving after test, February 1, 1912.
Average per cent of fat, 3·68; days in milk, 251.
Total production, milk, 10,034·31 lbs.; fat, 369·59 lbs.
Production required for registration—milk, 8,568·75 lbs.; fat, 312·27 lbs.

No. 219. '**Cloverleaf Faforit Mercena,**' No. 9147.
Sire, '**Count Mercena Posch,**' No. 3902.
Dam, '**Faforit 10th's Beauty,**' No. 5622.

Owned by A. E. Smith & Son, Millgrove, Ont.
Bred by R. F. Hicks, Newton Brook, Ont.
Test commenced, December 1, 1910.
Age at commencement of test, 3 years and 262 days.
Date of calving, November 30, 1910.
Date of previous calving, October 3, 1909.
Date of calving after test, February 10, 1912.
Average per cent of fat, 3·19; days in milk, 365.
Total production, milk, 14,281·5 lbs; fat, 456·36 lbs.
Production required for registration—milk, 9,220·5 lbs.; fat, 313·39 lbs.

No. 226. '**Manor DeKol Netherland,**' No. 9608.
Sire, '**Manor Prince DeKol,**' No. 3735.
Dam, '**Inka Netherland Bessie,,** No. 6364.
Owned by J. W. McCormick, Morewood, Ont.
Bred by Stanley Stephenson, Cannamore, Ont.
Test commenced, January 11, 1911.
Age at commencement of test, 3 years and 264 days.
Date of calving, January 10, 1911.
Date of calving after test, March 6, 1912.
Average per cent of fat, 4·45; days in milk, 365.
Total production, milk, 10,397·5 lbs.; fat, 462·82 lbs.
Production required for registration—milk, 9,226 lbs.; fat, 313·5 lbs.

No. 227. '**Madam B. 2nd's Pauline,**' No. 9218.
Sire, '**Prince Pauline DeKol 6th,**' No. 2467.
Dam, '**Madame B. 2nd,**' No. 3528.
Bred and owned by R. W. Walker, Utica, Ont.
Test commenced, November 24, 1910.
Age at commencement of test, 3 years and 188 days.
Date of calving, November 21, 1910.
Date of previous calving, April 26, 1909.
Date of calving after test, January 24, 1912.
Average per cent of fat, 3·46; days in milk, 363.
Total production, milk, 9,590·55 lbs.; fat, 332·74 lbs.
Production required for registration—milk, 9,017 lbs.; fat, 306·5 lbs.

No. 230. '**Violet's Daisy's Pauline,**' No. 9132.
Sire, "**Prince Pauline DeKol A,**' No. 3284.
Dam, '**Violet's Daisy,**' No. 4863.
Owned by Dr. John Watson, Howick, Que.
Bred by John Purse, Herdman, Que.
Test commenced, March 9, 1911.
Age at commencement of test, 3 years and 360 days.
Date of calving, March 7, 1911.
Date of previous calving, April, 1910.
Date of calving after test, March 9, 1912.
Average per cent of fat, 3·7; days in milk, 310.
Total production, milk, 11,470·75 lbs.; fat, 423·90 lbs.
Production required for registration—milk, 9,486·25 lbs.; fat, 322·5 lbs.

COWS TWO YEARS OLD AND UNDER THREE.

No. 160. '**Canaan Beauty,**' No. 8457.
Sire, '**Lilly's Judge Akkrum DeKol,**' No. 2484.
Dam, '**Holland Beauty,**' No. 2117.

Bred and owned by F. E. Came, St. Lambert, Que.
Test commenced, March 7, 1910.
Age at commencement of test, 2 years and 360 days.
Date of calving, March 7, 1910.
Date of calving after test, April 11, 1911.
Average per cent of fat, 3·09; days in milk, 365.
Total production, milk, 9,431 lbs.; fat, 291·58 lbs.
Production required for registration—milk, 8,490 lbs.; fat, 288·5 lbs.

No. 161. '**Lady Fairmont Posch,**' No. 10679.
Sire, '**Sir Christopher Wren,**' No. 6600.
Dam, '**Irene Fairmont,**' No. 6858.
Bred and owned by F. I. Burrill, Holbrook, Ont.
Test commenced, April 8, 1910.
Age at commencement of test, 2 years and 30 days.
Date of calving, April 5, 1910.
Date of calving after test, April 11, 1911.
Average per cent of fat, 2·95; days in milk, 308.
Total production, milk, 9,525·17 lbs.; fat, 281·30 lbs.
Production required for registration—milk, 7,582·5 lbs.; fat, 263 lbs.

No. 164. '**Polly Woodland DeKol,**' No. 10390.
Sire, '**Woodland Sarcastic Lad,**' No. 4890.
Dam, '**Bessie Jane DeKol,**' No. 7365.
Bred and owned by S. M. Peacock, Mt. Salem, Ont.
Test commenced, March 10, 1910.
Age at commencement of test, 1 year and 360 days.
Date of calving, March 10, 1910.
Date of calving after test, May 1, 1911.
Average per cent of fat, 3·20; days in milk, 365.
Total production, milk, 9,433·15 lbs.; fat, 302·64 lbs.
Production required for registration—milk, 7,500 lbs.; fat, 255 lbs.

No. 167. '**Aaggie DeKol of Woodland,**' No. 10413.
Sire, '**Woodland Sarcastic Lad,**' No. 4890.
Dam, '**Aaggie DeKol Schuiling,**' No. 7666.
Bred and owned by J. M. VanPatter, Aylmer, Ont.
Test commenced, June 24, 1910.
Age at commencement of test, 2 years and 68 days.
Date of calving, June 23, 1910.
Date of calving after test, August 11, 1911.
Average per cent of fat, 3·21; days in milk, 365.
Total production, milk, 11,884·5 lbs.; fat, 382·31 lbs.
Production required for registration—milk, 7,687 lbs.; fat, 261·3.

No. 168. '**Korndyke DeKol Daisy,**' No. 10317.
Sire, '**Korndyke Lily DeKol,**' No. 3263.
Dam, '**Daisy of Meadowlane,**' No. 6337.
Owned by Richard Clarke, Henfryn, Ont.
Bred by B. Mallory, Belleville, Ont.
Test commenced, February 26, 1910.
Age at commencement of test, 1 year and 364 days.
Date of calving, January 22, 1910.
Date of calving after test, March 23, 1911.
Average per cent of fat, 3·61; days in milk, 302.
Total production, milk, 9,685·75 lbs.; fat, 349·52 lbs.
Production required for registration—milk, 7,500 lbs.; fat, 255 lbs.

No. 170. '**Diana Woodland Sarcastic,**' No. 10389.
Sire, '**Woodland Sarcastic Lad,**' No. 4890.
Dam, '**Queen Jane,**' No. 6509.
Bred and owned by G. E. Peacock, Mt. Salem, **Ont.**
Test commenced, March 25, 1910.
Age at commencement of test, 1 year and 354 days.
Date of calving, March 25, 1910.
Date of calving after test, May 15, 1911.
Average per cent of fat, 3·91; days in milk, 358.
Total production, milk, 9,595·45 lbs.; fat, 375·23 lbs.
Production required for registration—milk, 7,500 lbs.; fat, 255 lbs.

No. 171. '**Korndyke Wayne DeKol,**' No. 9609.
Sire, '**Manor Korndyke Wayne,**' No. 4208.
Dam, '**Amy Peep 3rd,**' No. 5513.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, March 24, 1910.
Age at commencement of test, 2 years and 270 days.
Date of calving, March 23, 1910.
Date of calving after test, April 11, 1911.
Average per cent of fat, 3·738; days in milk, 340.
Total production, milk, 10,932 lbs.; fat, 408·70 lbs.
Production required for registration—milk, 8,242·5 lbs.; fat, 280 lbs.

No. 177. '**Pauline DeKol Albino,**' No. 9621.
Sire, '**Sir Mutual Butter Boy 2nd,**' No. 3827.
Dam, '**Pauline Albino DeKol,**' No. 3231.
Owned by S. J. Carlyle, Chesterville, Ont.
Bred by R. O. Morrow, Hilton, Ont.
Test commenced, April 1, 1910.
Age at commencement of test, 2 years and 270 days.
Date of calving, March 26, 1910.
Date of calving after test, May 2, 1911.
Average per cent of fat, 3·26; days in milk, 365.
Total production, milk, 11,071·6 lbs.; fat, 361·77 lbs.
Production required for registration—milk, 8,242·5 lbs.; fat, 280 lbs.

No. 178. '**Belle Dewdrop 6th,**' No. 10133.
Sire, '**Lord Robert DeKol,**' No. 3597.
Dam, '**Belle Dewdrop,**' No. 4083.
Owned by E. Laidlaw & Sons, Aylmer West, Ont.
Bred by E. Laidlaw, Aylmer, Ont.
Test commenced, April 10, 1910.
Age at commencement of test, 1 year and 349 days.
Date of calving, April 9, 1910.
Date of calving after test, May 13, 1911.
Average per cent of fat, 2·97; days in milk, 312.
Total production, milk, 11,391 lbs.; fat, 338·39 lbs.
Production required for registration—milk, 7,500 lbs.; fat, 255 lbs.

No. 182. '**Queen's Pride of DeKol,**' No. 10955.
Sire, '**Katie's Iosco DeKol,**' No. 3350.
Dam, '**Queen of Minster,**' No. 2203.
Bred and owned by R. Honey, Brickley, **Ont.**
Test commenced, May 18, 1910.

Age at commencement of test, 2 years and 58 days.
Date of calving, May 15, 1910.
Date of calving after test, July 14, 1911.
Average per cent of fat, 3·04; days in milk, 365.
Total production, milk, 9,718·25 lbs.; fat, 295·82 lbs.
Production required for registration—milk, 7,659·5 lbs.; fat, 260 lbs.

No. 187. '**Lucy DeKol Posch,**' No. 8326.
Sire, '**Tiny's Posch,**' No. 4785.
Dam, '**Jean DeKol,**' No. 5357.
Owned by J. M. VanPatter, Alymer, Ont., R.F.D. No. 1.
Bred by A. Crichton, St. George, Ont.
Test commenced, February 22, 1910.
Age at commencement of test, 2 years and 335 days.
Date of calving, February 21, 1910.
Date of calving after test, April 30, 1911.
Average per cent of fat, 3·31; days in milk, 365.
Total production, milk, 12,328·75 lbs.; fat, 408·18 lbs.
Production required for registration—milk, 8,421·25 lbs.; fat, 286·18 lbs.

No. 192. '**Canaan Mosetta,**' No. 8527.
Sire, '**Lilly's Judge Akkrum DeKol,**' No. 2484.
Dam, '**Lovelia 2nd's Aaggie,**' No. 2318.
Bred and owned by F. E. Came, St. Lambert, Que.
Test commenced, February 21, 1910.
Age at commencement of test, 2 years and 351 days.
Date of calving, February 21, 1910.
Date of previous calving, March 30, 1909.
Date of calving after test, May 5, 1911.
Average per cent of fat, 3·47; days in milk, 366.
Total production, milk, 9,701 lbs.; fat, 336·93 lbs.
Production required for registration—milk, 8,464·25 lbs.; fat, 326·7 lbs.

No. 193. '**National Queen DeKol,**' No. 10134.
Sire, '**Lord Roberts DeKol,**' No. 3597.
Dam, '**Faultless Queen DeKol,**' No. 5794.
Bred and owned by E. Laidlaw & Sons, Aylmer West, Ont.
Test commenced, October 28, 1910.
Age at commencement of test, 2 years and 86 days
Date of calving, October 19, 1910.
Date of calving after test, November 24, 1911.
Average per cent of fat, 3·43; days in milk, 316.
Total production, milk, 14,735·5 lbs.; fat, 506·16 lbs.
Production required for registration—milk, 7,736·5 lbs.; fat, 265 lbs.

No. 194. '**Lady Calamity Pauline,**' No. 11248.
Sire, '**Frontier Paul DeKol,**' No. 6159.
Dam, '**Josephine Paul Calamity,**' No. 8590.
Owned by Cecil W. Hagar, Welland, Ont.
Bred by G. A. Gilroy, Glen Buell, Ont.
Test commenced, November 2, 1910.
Age at commencement of test, 2 years and 13 days.
Date of calving, October 31, 1910.
Date of calving after test, December 9, 1911.
Average per cent of fat, 3·20; days in milk, 365.
Total production, milk, 10,369·81 lbs.; fat, 332·73 lbs.
Production required for registration—milk, 7,535·75 lbs.; fat, 256·2 lbs.

No. 195. '**Doris Lee Pietertje,**' No. 9011.
Sire, '**Lee Court Verbelle,**' No. 3076.
Dam, '**DeKol Pietertje Doris,**' No. 3994.
Owned by S. J. Foster, Bloomfield, Ont.
Bred by R. W. Ireland, Smithfield, Ont.
Test commenced, April 8, 1910.
Age at commencement of test, 2 years and 40 days.
Date of calving, April 7, 1910.
Date of calving after test, May 15, 1911.
Average per cent of fat, 3·57; days in milk, 327.
Total production, milk, 11,324·75 lbs.; fat, 404·96 lbs.
Production required for registration—milk, 7,610 lbs.; fat, 258·7 lbs.

No. 197. '**Aaggie Emily of Riverside,**' No. 10253.
Sire, '**Sir Pietertje Posch DeBoer,**' No. 3362.
Dam, '**Aaggie's Emily,**' No. 3568.
Owned by L. W. Hutchinson, Aurora, Ont.
Bred by Matt. Richardson, Caledonia, Ont.
Test commenced, August 10, 1910.
Age at commencement of test, 2 years and 181 days.
Date of calving, August 6, 1910.
Date of calving after test, October 22, 1911.
Average per cent of fat, 3·16; days in milk, 365.
Total production, milk, 14,376·5 lbs.; fat, 455·27 lbs.
Production required for registration—milk, 7,997·75 lbs.; fat, 272·35 lbs.

No. 199. '**Buffalo Girl Butter Maid,**' No. 11651.
Sire, '**Brookbank Butter Baron,**' No. 2955.
Dam, '**Beauty's Butter Girl,**' No. 3562.
Owned by Tig. Wood, Mitchell, Ont.
Bred by P. D. Ede, Oxford Centre, Ont.
Test commenced, December 5, 1910.
Age at commencement of test, 2 years and 17 days.
Date of calving, December 5, 1910.
Date of calving after test, December 4, 1911.
Average per cent of fat, 3·38; days in milk, 328.
Total production, milk, 13,114·4 lbs.; fat, 443·34 lbs.
Production required for registration—milk, 7,546·75 lbs.; fat, 256·5 lbs.

No. 201. '**Bessie DeKol of Niagara,**' No. 9354.
Sire, '**Count Mercena Posch,**' No. 3902.
Dam, '**Bessie DeKol of Whittaker,**' No. 6954.
Owned by John C. Brown, Stamford, Ont.
Bred by Jas. Rettie, Norwich, Ont.
Test commenced, October 9, 1910.
Age at commencement of test, 2 years and 240 days.
Date of calving, October 8, 1910.
Date of previous calving, June 7, 1909.
Date of calving after test, December 15, 1911.
Average per cent of fat, 3·44; days in milk, 365.
Total production, milk, 13,439·18 lbs.; fat, 462·86 lbs.
Production required for registration—milk, 8,160 lbs.; fat, 277·3 lbs.

No. 204. '**Johanna Mercedes of Riverside,**' No. 10858.
Sire, '**Sir Pietertje Posch De Boer,**' No. 3362.
Dam, '**Inka Mercedes DeKol 4th.**' No. 6191.

Owned by C. Duff. Nelles, Boston, Ont.
Bred by J. W. Richardson, Caledonia, Ont.
Test commenced, December 9, 1910.
Age at commencement of test, 1 year and 364 days.
Date of calving, December 8, 1910.
Date of calving after test, December 28, 1911.
Average per cent of fat, 3·27; days in milk, 336.
Total production, milk, 11,520·7 lbs.; fat, 377·56 lbs.
Production required for registration—milk, 7,500 lbs.; fat, 255 lbs.

No. 205. '**Belle Mercedes Posch,**' No. 12117.
Sire, '**Count Posch Mechthilde,**' No. 5218.
Dam, '**Glenside Peach Bloom,**' No. 7872.
Owned by Elias Ruby, Hickson, Ont.
Bred by Geo. North, Guelph, Ont.
Test commenced, December 1, 1910.
Age at commencement of test, 2 years and 10 days.
Date of calving, November 21, 1910.
Date of calving after test, January 8, 1912.
Average per cent of fat, 3·19; days in milk, 365.
Total production, milk, 9,265·75 lbs.; fat, 295·74 lbs.
Production required for registration—milk, 7,527·5 lbs.; fat, 255·9 lbs.

No. 207. '**Lulu Keyes,**' No. 10333.
Sire, '**Inka Darkness Keyes,**' No. 3287.
Dam, '**Disone 2nd's Lulu,**' No. 2982.
Owned by E. B. Mallory, Frankford, Ont.
Bred by B. Mallory, Belleville, Ont.
Test commenced, January 11, 1911.
Age at commencement of test, 2 years and 341 days.
Date of calving, January 8, 1911.
Date of previous calving, January 19, 1910.
Date of calving after test, February 1, 1912.
Average per cent of fat, 2·81; days in milk, 365.
Total production, milk, 19,258·45 lbs.; fat, 542·67 lbs.
Production required for registration—milk, 8,437·75 lbs.; fat, 286·7 lbs.

No. 210. '**Utica Teake DeKol,**' No. 9009.
Sire, '**Utica Lad,**' No. 3052.
Dam, '**Sady's Teake's Tirania DeKol,**' No. 5207.
Owned by A. J. Tamblyn, Orono, Ont.
Bred by Geo. Black, Winchester, Ont.
Test commenced, December 2, 1910.
Age at commencement of test, 2 years and 274 days.
Date of calving, December 2, 1910.
Date of calving after test, January 6, 1912.
Average per cent of fat, 3·48; days in milk, 365.
Total production, milk, 10,440·5 lbs.; fat, 363·71 lbs.
Production required for registration—milk, 8,253·5 lbs.; fat, 280·5 lbs.

No. 211. '**Princess Concordia,**' No. 11445.
Sire, '**Beryl Wayne Paul Concordia,**' No. 3130.
Dam, '**Princess May DeKol,**' No. 3393.
Owned by A. J. Tamblyn, Orono, Ont.
Bred by Jas. Scott, Winchester, Ont.

Test commenced, December 4, 1910.
Age at commencement of test, 2 years and 184 days.
Date of calving, December 4, 1910.
Date of calving after test, January 5, 1912.
Average per cent of fat, 3·29; days in milk, 365.
Total production, milk, 11,401 lbs.; fat, 375·96 lbs.
Production required for registration—milk, 8,006 lbs.; fat, 272·1 lbs.

No. 214. '**Sady Teake DeKol Beryl,**' No. 12564.
Sire, '**Beryl Wayne Paul Concordia,**' No. 3130.
Dam, '**Sady's Teake's Maple Glen Countess,**' No. 1682.
Owned by R. Clarke, Henfryn, Ont.
Bred by Wm. Higginson, Inkerman, Ont.
Test commenced, February 10, 1911.
Age at commencement of test, 2 years and 42 days.
Date of calving, February 7, 1911.
Date of calving after test, January 26, 1912.
Average per cent of fat, 3·46; days in milk, 293.
Total production, milk, 8,864·81 lbs.; fat, 307·41 lbs.
Production required for registration—milk, 7,615·5 lbs.; fat, 258·9 lbs.

No. 217. '**Boutsje Posch DeBoer,**' No. 8634.
Sire, '**Prince Posch Pietertje C,**' No. 4164.
Dam, '**Lulu Glaser,**' No. 5099.
Owned by S. Lemon, Lynden, Ont.
Bred by G. W. Clemons, St. George, Ont.
Test commenced, November 21, 1910.
Age at commencement of test, 2 years and 363 days.
Date of calving, November 20, 1910.
Date of calving after test, January 25, 1912.
Average per cent of fat, 3·6; days in milk, 349.
Total production, milk, 10,700·9 lbs.; fat, 391·93 lbs.
Production required for registration—milk, 8,504·50 lbs.; fat, 287·14 lbs.

No. 218.—'**Agnes Evergreen,**' No. 10339.
Sire, '**Evergreen's Teake,**' No. 5041.
Dam, '**Alice Posch,**' No. 7462.
Owned by S. Lemon, Lynden, Ont.
Bred by G. W. Clemons, St. George, Ont.
Test commenced, November 17, 1910.
Age at commencement of test, 2 years and 180 days.
Date of calving, November 16, 1910.
Date of calving after test, December 21, 1911.
Average per cent of fat, 3·4; days in milk, 344.
Total production, milk, 9,423·6 lbs.; fat, 324·67 lbs.
Production required for registration—milk, 7,995 lbs.; fat, 271·75 lbs.

No. 223. '**Korndyke Pauline DeKol 2nd,**' No. 11573.
Sire, '**Manor Korndyke Wayne,**' No. 4208.
Dam, '**Pauline Aaggie DeKol 2nd,**' No. 5889.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, March 5, 1911.
Age at commencement of test, 2 years and 270 days.
Date of calving, March 3, 1911.
Date of calving after test, February 23, 1912.

Average per cent of fat, 4·25; days in milk, 333.
Total production, milk, 8,975 lbs.; fat, 381·59 lbs.
Production required for registration—milk, 8,247·5 lbs.; fat, 282·12 lbs.

No. 224. '**Korndyke DeKol Queen,**' No. 14124.
Sire, '**Manor Prince DeKol 2nd,**' No. 6486.
Dam, '**Brooklands Korndyke Wayne,**' No. 9517.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, April 19, 1911.
Age at commencement of test, 1 year and 304 days.
Date of calving, April 17, 1911.
Date of calving after test, March 7, 1912.
Average per cent of fat, 3·84; days in milk, 307.
Total production, milk, 7,548·75 lbs.; fat, 290·35 lbs.
Production required for registration—milk, 7,500 lbs.; fat, 255 lbs.

No. 225. '**Brooklands Korndyke Gem,**' No. 11812.
Sire, '**Calamity Korndyke Wayne,**' No. 5669.
Dam, '**Korndyke Belle,**' No. 8360.
Bred and owned by J. W. McCormick, Morewood, Ont.
Test commenced, March 23, 1911.
Age at commencement of test, 2 years and 239 days.
Date of calving, March 21, 1911.
Date of calving after test, March 14, 1912.
Average per cent of fat, 3·8; days in milk, 327.
Total production, milk, 8,615·06 lbs.; fat, 334·91 lbs.
Production required for registration—milk, 8,157·25 lbs.; fat, 277·25 lbs.

No. 226. '**Summer Hill May,**' No. 9288.
Sire, '**John Henry Acme DeKol,**' No. 3668.
Dam, '**Springbrook Countess,**' No. 1572.
Owned by John F. Smith, Armitage, Ont.
Bred by Geo. R. Hanes, Dundas, Ont.
Test commenced, January 8, 1911.
Age at commencement of test, 2 years and 331 days.
Date of calving, January 8, 1911.
Date of previous calving, December 23, 1909.
Date of calving after test, March 14, 1912.
Average per cent of fat, 3·04; days in milk, 319.
Total production, milk, 10,242·5 lbs.; fat, 311·90 lbs.
Production required for registration—milk, 8,410·25 lbs.; fat, 285·8 lbs.

No. 231. '**Princess Calamity Posch DeKol,**' No. 10505.
Sire, '**King Posch DeKol,**' No. 4529.
Dam, '**Princess Calamity Wayne,**' No. 6142.
Owned by Tig. Wood, Mitchell, Ont.
Bred by Walburn Rivers, Folden's, Ont.
Test commenced, February 14, 1911.
Age at commencement of test, 2 years and 82 days.
Date of calving, February 14, 1911.
Date of calving after test, March 2, 1912.
Average per cent of fat, 3·14; days in milk, 336.
Total production, milk, 11,021·5 lbs.; fat, 347·12 lbs.
Production required for registration—milk, 7,725·5 lbs.; fat, 262·6 lbs.

No. 233. '**Gertie Posch Westwoud.**' No. 11862.
Sire, '**Cornelia's Posch.**' No. 2250.
Dam, '**Lilly Westwoud 2nd.**' No. 3966.
Bred and owned by Thos. Hartley, Downsview, Ont.
Test commenced, December 26, 1910.
Age at commencement of test, 2 years and 125 days.
Date of calving, December 25, 1910.
Date of calving after test, February 19, 1912.
Average per cent of fat, 3·15; days in milk, 363.
Total production, milk, 10,869·82 lbs.; fat, 343·064 lbs.
Production required for registration—milk, 7,843·75 lbs.; fat, 266·6 lbs.

No. 234. '**Schuiling Pride 2nd,**' No. 12007.
Sire, '**Lady Pietertje Mercedes' Paul,**' No. 3893.
Dam, '**Schuiling Pride,**' No. 2377.
Bred by Samuel Pool, Norwich, Ont.
Owned by Thos. Hartley, Downsview, Ont.
Test commenced, December 25, 1910.
Age at commencement of test, 2 years and 55 days.
Date of calving, December 25, 1910.
Date of calving after test, January 29, 1912.
Average per cent of fat, 3·97; days in milk, 365.
Total production, milk, 7,872·6 lbs.; fat, 312·691 lbs.
Production required for registration—milk, 7,651·25 lbs.; fat, 260 lbs.

JERSEY.

COWS FIVE YEARS OLD AND OVER.

Production required for registration: milk, 8,500 lbs.; fat, 337 lbs.

No. 7. '**Fancy's Countess,**' No. 694.
Sire, '**Koffee's Count,**' No. 24405. A.J.C.C.
Dam, '**Fancy's Mamie,**' No. 97264. A.J.C.C.
Bred and owned by A. H. Menzies & Son, Pender Island, B.C.
Test commenced, March 19, 1910.
Age at commencement of test, 8 years.
Date of calving, March 19, 1910.
Date of previous calving, February 25, 1909.
Date of calving after test, May 15, 1911.
Average per cent of fat, 5·75; days in milk, 365.
Total production, milk, 8,589·5 lbs.; fat, 493·88 lbs.

No. 11. '**Aristocrat's Fanny,**' No. 1188.
Sire, '**Baron,**' No. 2845.
Dam, '**Mon Plaisir's Fanny,**' No. 203640. A.J.C.C.
Owned by B. H. Bull & Sons, Brampton, Ont.
Bred by P. J. Priaulx, Jersey.
Test commenced, September 30, 1910.
Age at commencement of test, 8 years.
Date of calving, September 30, 1910.
Date of previous calving, October 1909.
Date of calving after test, October 2, 1911.
Average per cent of fat, 4·86; days in milk, 365.
Total production, milk, 11,097·5 lbs.; fat, 539·48 lbs.

No. 13. '**Brampton Blue Fly**,' No. 300.
Sir, '**Blue Blood of Dentonia**,' No. 52,898. A.J.C.C.
Dam, '**Brampton Pretty Maid**.' No. 280.
Bred and owned by B. H. Bull & Sons, Brampton, Ont.
Test commenced, October 14, 1910.
Age at commencement of test, 5 years and 356 days.
Date of calving, October 14, 1910.
Date of previous calving, October 9, 1908.
Date of calving after test, December 3, 1911.
Average per cent of fat, 5·12; days in milk, 365.
Total production, milk, 9,982·4 lbs.; fat, 511·91 lbs.

COWS FOUR YEARS OLD AND UNDER FIVE.

No. 8. '**Lady Buttercup of Pender**,' No. 698.
Sire, '**Doua's Dewey**,' No. 69211. A.J.C.C.
Dam, '**Princess May Victor**,' No. 177110. A.J.C.C.
Bred and owned by A. H. Menzies & Son, Pender Island, B.C.
Test commenced, March 5, 1910.
Age at commencement of test, 4 years and 26 days.
Date of calving, March 5, 1910.
Date of previous calving, January 16, 1909.
Date of calving after test, June 5, 1911.
Average per cent of fat, 5·01; days in milk, 365.
Total production, milk, 9,305·5 lbs.; fat, 466·52 lbs.
Production required for registration, milk, 7,571·5 lbs.; fat, 300 lbs.

No. 9. '**Golden Milkmaid**,' No. 1483.
Sire, '**Milkmaid's Prize**,' No. 69160. A.J.C.C.
Dam, '**Golden Colea**,' No. 182124. A.J.C.C.
Owned by A. H. Menzies & Son, Pender Island, B.C.
Bred by D. & A. Deacon, Mayne Island, B.C.
Test commenced, September 27, 1910.
Age at commencement of test, 4 years and 245 days.
Date of calving, September 26, 1910.
Date of previous calving, September 17, 1909.
Date of calving after test, October 29, 1911.
Average per cent of fat, 4·85; days in milk, 238.
Total production, milk, 8,442·5 lbs.; fat, 409·41 lbs.
Production required for registration—milk, 8,168·25 lbs.; fat, 323·7 lbs.

COWS TWO YEARS OLD AND UNDER THREE.

No. 10. '**Lady Flora**,' No. 729.
Sire, '**Star's Rex**,' No. 102.
Dam, '**Rosalin of Maple Grove**,' No. 153301. A.J.C.C.
Bred and owned by Wm. Clark, North Wiltshire, P.E.I.
Test commenced, March 10, 1911.
Age at commencement of test, 2 years and 164 days.
Date of calving, March 5, 1911.
Date of calving after test, December 3, 1911 (premature).
Average per cent of fat, 4·55; days in milk, 266.
Total production, milk, 7,549·87 lbs.; fat, 343·34 lbs.
Production required for registration—milk, 5,951 lbs.; fat, 236 lbs.

No. 12. '**Brampton Fereor Tister,**' No. 987.
Sire, '**Fereor,**' No. 391.
Dam, '**Brampton Tister Dot,**' No. 201762. A.J.C.C.
Bred and owned by B. H. Bull & Sons, Brampton, Ont.
Test commenced, September 2, 1910.
Age at commencement of test, 2 years and 14 days.
Date of calving, September 1, 1910.
Date of calving after test, September 30, 1911.
Average per cent of fat, 4·9; days in milk, 364.
Total production, milk, 6,576 lbs.; fat, 326·28 lbs.
Production required for registration—milk, 5,885 lbs.; fat, 219·54 lbs.

AYRSHIRE BULLS QUALIFIED FOR REGISTRATION.

No. 1. '**Dairyman of Glenora,**' Reg. No. 13475.
Daughters qualified—
1st. 'Susie of Hickory Hill,' No. 22336.
Dam, 'Briery Banks Susie,' No. 2847.
2nd. 'Jubilee of Hickory Hill,' No. 23480.
Dam, 'Jubilee of Hickory Hill,' No. 12071.
3rd. 'Rosalie of Hickory Hill,' No. 23482.
Dam, 'Ladysmith,' No. 12394.
4th. 'Snowflake of Hickory Hill,' No. 23481.
Dam, 'Helen of Warkworth,' No. 14184.
5th. 'Snowdrop of Hickory Hill,' No. 23599.
Dam, 'Gipsy Maid,' No. 12391.
6th. 'Pet of Hickory Hill,' No. 21259.
Dam, 'Flower of Hickory Hill,' No. 12031.

No. 2. '**Full Bloom of Hindsward,**' Reg. No. 16936.
Daughters qualified—
1st. 'Isaleigh Nancy 1st,' No. 20525.
Dam, 'Nancy of Fairfield Mains,' No. 11080
2nd. 'Daisy of Westland,' No. 21799.
Dam, 'Daisy of Carlheim,' No. 11548.
3rd. 'Miss Orlia,' No. 20098.
Dam, 'Isaleigh Carlina,' No. 18280.
4th. 'Isaleigh Miss Sandy,' No. 23827.
Dam, 'Miss Sandilands,' No. 8934.

No. 3. '**The Miller o'the Dee,**' Reg. No. 10422.
Daughters qualified—
1st. 'Ruth,' No. 23598.
Dam, 'Primrose of Tanglewyld,' No. 15943.
2nd. 'Bonnie Doon,' No. 19437.
Dam, 'Sprightly 5th,' No. 2587.
3rd. 'Madge,' No. 27700.
Dam, 'Bonnie Doon,' No. 19437.
4th. 'Oddity,' No. 27699.
Dam, 'Little Queen 3rd,' No. 13570.

No. 4. '**Hamilton Chief,**' Reg. No. 17491.
Daughters qualified—
1st. 'Sybella of Springbank,' No. 27691.

Dam, 'Lady White of Springbank,' No. 27690.
2nd. 'Jemima of Springbank,' No. 27689.
Dam, 'Jemima,' No. 27688.
3rd. 'Briery of Springbank,' No. 29616.
Dam, 'Briery Banks Mermaid,' No. 3498.
4th. 'Speck of Springbank,' No. 29619.
Dam, 'Stylish Alice,' No. 29621.
5th. 'Ruby Springbank,' No. 29622.
Dam, 'May Blossom,' No. 29342.
6th. 'Jemima of Springbank 2nd,' No. 29618.
Dam, 'Jemima,' No. 27688.

No. 5. **'Scottie,'** Reg. No. 19718.
Daughters qualified—
1st. 'White Legged Kirsty,' No. 21958.
Dam, 'White Wings,' No. 9304.
2nd. 'Scottie's Nancy,' No. 24265.
Dam, 'Nancy 2nd,' No. 19780.
3rd. 'Scottie's Lassie,' No. 24264 .
Dam, 'Lassie 2nd,' No. 13189.
4th. 'Peggy Murphy,' No. 27252.
Dam, 'Daisy of Brookside,' No. 13785.
5th. 'Annie Laurie 3rd,' No. 27957.
Dam, 'Annie Laurie 2nd,' No. 15588.
6th. 'Scottie's White Wings,' No. 24266.
Dam, 'White Wings,' No. 9304.
7th. 'Scottie's Victoria,' No. 23675.
Dam, 'Victoria,' No. 13788.
8th. 'Scottie's Dandy 2nd,' No. 25690.
Dam, 'Dandy 1st of Brookside,' No. 13786.
9th. 'Scottie's Victoria 2nd,' No. 21870.
Dam, 'Victoria,' No. 13788.
10th. 'Scottie's Sarah,' No. 21870.
Dam, 'Sarah 2nd,' No. 13192.
11th. 'Scottie's Nancy 2nd,' No 27255.
Dam, 'Nancy 2nd,' No. 19780.

No. 6. **'Rob Roy,'** Reg. No. 14584.
Daughters qualified—
1st. 'Lady Menie,' No. 18727.
Dam, 'Lady Ottawa,' No. 3001.
2nd. 'Dewdrop of Menie,' No. 25875.
Dam, 'Scotland's Best of Dentonia,' No. 13672.
3rd. 'Lass O'Gowrie,' No. 25190.
Dam, 'Jessie Blair Stewart of Menie,' No. 14549.
4th. 'Lang Legget Kirsty,' No. 26541.
Dam, 'Brownie of Menie,' No. 11632.

No. 7. **'Royal Star of Ste. Anne's,'** Reg. No. 7916.
Daughters qualified—
1st. **'Star's Annie Laurie,'** No. 21543.
Dam, 'Annie Laurie of Norwich,' No. 17837.
2nd. 'Star's Sarah,' No. 21541.
Dam, 'Sarah 2nd,' No. 13192.

3rd. 'Spottie,' No. 18651.
Dam, 'Ada 3rd,' No. 13650.
4th. 'Star's Alpha,' No. 17839.
Dam, 'Daisy 1st of Brookside,' No. 13785

HOLSTEIN-FRIESIAN BULLS QUALIFIED FOR REGISTRATION.

No. 1. **'Victor DeKol Gretqui,'** Reg. No. 3088.
Daughters qualified—
1st. 'Bell Tensen,' No. 6736.
Dam, 'Polly Tensen,' No. 2650.
2nd. 'Minnie Springbrook,' No. 6735.
Dam, 'Rosa Springbrook,' No. 5381.
3rd. 'Bessie DeKol Tensen,' No. 7852.
Dam, 'Jean Tensen,' No. 3425.
4th. 'Lucy Staple,' No. 7850.
Dam, 'Nettie Staple,' No. 3736.

No. 2. **'Lord Roberts DeKol,'** Reg. No. 3597.
Daughters qualified—
1st. 'Pauline Texal,' No. 9646.
Dame, 'Bessie Texal Pietertje,' No. 9645
2nd. 'Helbon DeKol 2nd,' No. 8511.
Dam, 'Helbon DeKol,' No. 5631.
3rd. 'Belle Dewdrop 5th,' No. 8514.
Dam, 'Belle Dewdrop,' 4083.
4th. 'National Queen DeKol,' No. 10134.
Dam, 'Faultless Queen DeKol,' No. 5794.

No. 3. **'Count Echo DeKol.'** Reg. No. 1465.
Daughters qualified—
1st. 'Rosa Lee DeKol,' No. 3127.
Dam, 'Rosa Lee,' No. 2360.
2nd. 'Jessie DeKol Echo,' No. 6295.
Dam, 'Jesse 2nd's Echo,' No. 2218.
3rd. 'Rosa Omega,' No. 3490.
Dam, 'Rosa,' No. 742.
4th. 'Sylvia,' No. 7765.
Dam, 'Lady Inka DeKol,' No. 4810.
5th. 'May Echo,' No. 3372.
Dam, 'Rosa May,' No. 2235.

No. 4. **'Count Mercena Posch,'** Reg. No. 3902.
Daughters qualified—
1st. 'Lady Faforit Posch,' No. 8949.
Dam, 'Faforit 7th's Beauty', No. 5077.
2nd. 'Bessie DeKol of Niagara,' No. 9354.
Dam, 'Bessie DeKol of Whittaker,' No. 6954.
3rd. 'Niagara Maid,' No. 9353.
Dam, 'Ferndale Maid,' No. 6952.
4th. 'Cloverleaf Faforit Mercena,' No. 9147.
Dam, 'Faforit 10th's Beauty,' No. 5622.

No. 5. '**Manor Korndyke Wayne**,' Reg. No. 4208.
Daughters qualified—
1st. 'Korndyke Wayne DeKol,' No. 9609.
Dam, 'Amy Peep 3rd,' No. 5513.
2nd. 'Brooklands Korndyke Wayne,' No. 9517.
Dam, 'Brookland's Sadie,' No. 5514.
3rd. 'Korndyke Pauline DeKol 2nd,' No. 11573.
Dam, 'Pauline Aaggie DeKol 2nd,' No. 5889.
4th. 'Aaggie DeKol,' No. 7928.
Dam, 'Pauline Aaggie DeKol,' No. 3688.

AYRSHIRE—COWS FIVE YEARS OLD AND OVER.

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
1	Almeda of Danville	15282	11,357·	409·9	3·60	365	G. A. Langelier	Cap Rouge, Que.
3	Lady Stewart	11055	9,015·25	344·6	3·83	315	Alex. Hume	Menie, Ont.
5	Mitile	11529	10,202·	375·3	3·67	365	G. A. Langelier	Cap Rouge, Que.
6	Lady Isabel	7407	8,884·	339·2	3·76	344	J. N. Greenshields	Danville, Que.
7	Miss Sandilands	8934	8,579·75	312·5	3·75	340	" "	"
8	Winona of Brookhill	7479	9,843·	371·	3·77	365	" "	"
11	Nellie Burns of Burnside	13317	8,722·25	320·5	3·66	275	R. R. Ness	Howick, Que.
12	Bargenoch Heather Bell	21366	8,548·25	314·9	3·66	332	"	"
17	Lady Pearl of Burnside	13467	9,226·25	328·34	3 56	287	"	"
21	Matchless Beauty of Netherlea	19601	8,845·	322·42	3·65	365	G. A. Langelier	Cap Rouge, Que.
22	Daisy of Carlheim	11548	12,297·	385·4	3 15	360	J. N. Greenshields	Danville, Que.
27	Chapleton Swaney	25330	8,599·25	366·9	4·26	355	H. Gordon	Howick, Que.
29	Daisy Queen	9705	13,158·3	495·4	3·68	365	E. Cohoon	Harrietsville, Ont.
31	Trixy	9707	11,222·4	446·26	3·97	365	"	" "
38	Dolly Dutton of Ste. Anne	10005	10,424·5	440·34	4·23	350	A.C. Wells & Son	Sardis, B. C.
41	Kirsty 2nd of Neidpath	10125	9,521·2	381·9	4·00	344	W.W. Ballantyne	Stratford, Ont.
42	Bertie of Springhill	8736	10,448.25	382·26	3·66	322	R. Hunter & Sons	Maxville, Ont.
43	Little Queen 2nd	9239	9,397·	375·44	4·00	3.0	A.C. Wells & Son	Sardis, B.C.
47	Barton Princess	9273	9,580·5	381·3	4·00	331	A. S. Turner	RyckmansCorners, Ont.
49	Nellie Gray of Hickory Hill	15332	9,981·75	402·88	4·03	330	N. Dyment	Clappison, Ont.
50	Neidpath Rose 3rd	10126	9,037·5	367·4	4·06	354	W.W. Ballantyne.	Stratford, Ont.
55	Burnside Brown Queen	27192	8,592·	353·9	4·10	309	G. A. Langelier	Cap Rouge, Que.
59	White Heather	16978	9,501·5	363·5	3·82	297	J. Begg	St. Thomas, Ont.
60	Nellie's Jewell	16871	9,093·5	394·6	4·34	276	"	"
70	Primrose of Tanglewyld	15943	13,536·	529·	3·90	356	Wooddisse Bros	Rothsay, Ont.
75	Dairymaid	13847	8,629·5	378·12	4·38	305	H. C. Hamill	Box Grove, Ont.
76	Scotland's Princess 2nd	16385	10,182·75	461·02	4·53	365	A. S. Turner	Ryckmans Cor., O.
78	Myrtle	12274	9,943·8	328·19	3·30	305	E. Cohoon	Harrietsville, Ont.
81	Marjorie	16535	10,783·75	461·26	4·28	324	Dir. Exp. Farms	Ottawa, Ont.
83	Annie Laurie 2nd	15588	15,134·4	598·45	3·95	365	E. Cohoon	Harrietsville, Ont.
85	Mariea	15136	11,428·	418·37	3 66	365	Hon. W. Owens	Montebello, Que.
94	Maggie of Culcaigrie	14338	8,620·	323·16	3·75	314	Dir. Exp. Farms	Ottawa, Ont.
97	Nellie Gray of Hickory Hill	15332	12,040.2	469·92	3·90	365	N. Dyment	Rural Route No. 2, Hamilton, Ont.
102	Highland Lass	12013	8,622·	346·87	4·13	358	Alex. Hume & Co.	Menie, Ont.
105	Annie Hume of Ingleside	20473	8,829·5	342·78	3·88	314	H. C. Hamill	Box Grove, Ont.
110	Eileen	18229	11,025·75	522·94	4·74	365	G. D. Mode	VankleekHill, O.
111	Duchess of Point Round	17569	10,599·5	485·199	4·57	345	"	" "
115	Victoria	13788	11,283·21	451·902	4·00	330	John McKee	Norwich, Ont.
126	Spottie	18651	9,517·	368·79	3 88	300	"	"
128	Little Gem of Elm Shade	18882	9,285·5	379·122	4·08	335	P.D. McArthur	North Georgetown, Que.
132	Primrose of Tanglewyld	15943	16.195·5	625·62	3·86	365	Wooddisse Bros	Rothsay, Ont.
134	Sarah 2nd	13192	11,626·2	442·35	3·80	358	John McKee	Norwich, Ont.
135	Duchess of Rockton	19695	9,681·46	375·58	3·88	365	N. Dyment	Rural Route No. 2 Hamilton, Ont.
141	WhiteCraig of Auchenbrain	16717	8,821·25	313·453	3·55	305	Macdonald College	Macdonald College Que.
143	Kirsty 3rd of Neidpath	14559	11.903·5	388·54	3·26	365	W. W. Ballantyne,	Stratford, Ont.
149	Lizzie Glen of Ste. Annes	16147	9,116·	365·29	4·00	333	Macdonald College	Macdonald Col., Q.
152	Pet of Hickory Hill	21259	13,191·	542·18	4·10	354	N. Dyment.	Clappison, Ont.
153	Flower of Metcalfe	30405	9,157 45	368·70	4·02	276	A. S. Turner & Son	Ryckman's Corners, Ont.
154	Flora of Metcalfe	30257	11,908·85	427·34	3·59	365	"	"
155	Brownie	13188	8,730·6	362·31	4·15	330	John McKee	Norwich, Ont.
156	Lady Cairn	14428	9,051·55	322·25	3·55	307	Wm. Thorn	Lynedock, Ont.
159	May Beauty	12400	9,580	372·24	3·88	321	Wm. Stewart & Son	Menie, Ont.
164	Mabel	12768	8,872·75	342·90	3·86	365	Jas. Begg	St. Thomas, Ont.
171	Dairymaid	13847	8,968·	333·97	3·72	321	H. C. Hamill	Box Grove, Ont.
172	Sarah of Brookside	17842	9,711·	388·88	4·00	314	John McKee	Norwich, Ont.
173	Annie of Warkworth	21493	9,383·5	390·99	4·16	275	Alex. Hume & Co.	Menie, Ont.
176	Daisy 1st of Brookside	13785	8,533·2	353·00	4·14	284	John McKee	Norwich, Ont.
182	Daisy 4th of Neidpath	17937	9,889·7	406·41	4·11	365	W. W. Ballantyne	Stratford, Ont.
187	Dairymaid	24702	11,100·	571·77	5·16	365	And. McRae & Sons	East Royalty, P.E.I.
190	Snowflake	19739	12,616·1	556·79	4·41	299	A.S. Turner & Son,	Ryckman's Corners, Ont.

COWS FIVE YEARS OLD AND OVER—*Concluded.*

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
195	Star's Alpha	17839	9,305·6	366·50	3·94	308	E. Cohoon	Harrietsville, Ont.
202	Buttercup	24187	10,623·	382·79	3·60	283	W. J. Carlyle	Chesterville, Ont.
205	Eileen	18220	13,825·75	635·48	4·59	365	G. D. Mode	Vankleek Hill, Ont
206	Sybella of Springbank	27691	11,468·8	428·68	3·74	307	A. S. Turner & Son	Ryckman's Corners, Ont.
207	Alice of Kerwood	30387	10,030·7	396·36	3·95	283	"	"
211	Wexford Blood	16730	9,719·50	402·75	4·1	337	Macdonald Col. Q.	Macdonald Col..Q.
212	Rose of Senneville	20376	10,144·5	394·28	3·82	356	G. H. Montgomery	Philipsburg, Q.

COWS FOUR YEARS OLD AND UNDER FIVE.

48	Snowflake of Hickory Hill.	23481	9,182·05	362·4	3·95	365	N. Dyment	R.R. No. 2 Hamilton, Ont.
52	Lady Menie	18727	8,005·	297·8	3·72	364	Wm. Stewart & Son	Menie, Ont.
72	Bonnie Doon	19437	9,357·	401·36	4·28	355	Wooddisse Bros.	Rothsay. Ont.
74	Molly	27600	11,268·6	372·42	3·35	296	E. Cohoon	Harrietsville, Ont.
80	Ethel Belle	21319	9,258·	385·66	4·15	350	J. Begg	St. Thomas, Ont.
82	Lassie of the Highlands	21491	9,309·1	410·54	4·41	350	F. H. Harris	Mt. Elgin, Ont.
84	Lily of the Valley	20300	8,028·37	333·55	4·16	327	Alex. Hume & Co.	Menie, Ont.
88	Clio of the Willows	20934	8,614·	330·67	3·84	284	W. Brown	Howick, Que.
92	Glenshamrock Canty Again	24826	7,531·75	310·62	4 11	344	A. Hume & Co.	Menie, Ont.
106	Peach of Ingleside	24330	7,590·	296·037	3·90	281	H. C. Hamill	Box Grove, Ont.
119	Buttercup of Ingleside	20476	9,138·75	372 04	4·07	364	"	"
121	Lessnessock Hopeful Rosie.	24728	8,295·	349·99	4·20	297	R. Hunter & Sons.	Maxville, Ont.
122	Kilbowie of Glenhurst	25026	7,690·25	322·87	4·20	334	"	"
129	Mary 1st., of St. Annes	22156	8,384·25	326·14	3·88	365	Macdonald College	Macdonald Coll.Q.
133	Ruth	23578	10,152·25	378·	3·72	327	Woodisse Bros.	Rothsay, Ont.
147	Julia	23580	9,753·25	470·31	4·82	365	"	"
150	Daisy	23582	8,679·	367·93	4·24	300	"	"
151	Maud of Hillview	23671	9,028·00	333·5	3·69	327	W. J. Carlyle	Chesterville, Ont.
180	Scotland Princess 2nd	23495	11,385·95	511·97	4·48	365	A. S. Turner	Ryckman's Corners, Ont.
199	Scottie's Sarah	21870	9,364·6	348·04	3·7	280	John McKee	Norwich, Ont.
200	Guy's Red Rose 2nd	29792	9,043·8	409·16	4·52	355	A. H. Trimble & Sons.	Red Deer, Alta.
201	Rena	28709	8,711·	332·53	3·8	270	W. J. Carlyle	Chesterville, Ont.
210	Kirsty of Ste. Annes	25968	9,150·75	334·43	3·65	358	Macdonald College	Macdonald Col. Q.

COWS THREE YEARS OLD AND UNDER FOUR.

15	Jubilee of Hickory Hill	23480	7,343·	320·22	4·36	263	N. Dyment	Clappison, Ont.
20	Rosalie of Hickory Hill	23482	7,935·7	350·	4·41	365	"	"
23	Primrose of Hickory Hill	15333	8,556·4	378·03	4·41	355	"	"
24	Norena	19391	7,142·75	282·02	3·94	350	W. D. Parker	Hatley, Que.
40	Woodroffe Lady Nancy	21454	7,197·5	303·91	4·22	302	A. C. Wells & Son.	Sardis, B.C.
44	Isaleigh Nancy 1st	20525	8,184·	316·16	3·86	288	J. N. Greenshields.	Danville, Que.
45	Beauty of Shannon Bank.	23519	7,677·	354·47	4·62	327	W. H. Tran	Cedar Grove, Ont.
58	Miss Orlia	20098	7,158·	433·33	4·65	365	G. A. Langelier	Cap Rouge, Que.
64	Canadian Princess	20108	11,377·55	521·91	4·59	335	A. S. Turner	Ryckmans Cor., O.
67	Dairy Queen of Springhill.	23743	8,023·75	331·85	4·13	32[illegible]	R. Hunter & Sons.	Maxville, Ont.
68	Shannon Bank Frances 2nd	23520	9,133·	330·32	3·94	361	W. H. Tran	Cedar Grove, Ont.
71	Ruth	23578	7,591·5	276·65	3·64	365	Wooddisse Bros.	Rothsay, Ont.
73	Daisy	23582	7,554·	334·88	4·48	330	"	"
77	Star's Annie Laurie	21543	8,230·3	330·87	4·02	319	E. Cohoon	Harrietsville, Ont.
86	Julia	23580	8,062·5	377·33	4·68	339	Wooddisse Bros.	Rothsay, Ont.
93	Denty 4th of Ottawa.	25269	6,942·5	312·2	4·50	341	Dir. Experi. Farms	Ottawa, Ont.
96	Forget-me-not of Hickory Hill.	27661	7,578·8	309·05	4·08	365	N. Dyment	Rural Route No. 2, Hamilton, Ont.
107	Clarice of Ravensdale	22271	7,279·75	294·72	4·048	346	W. F. Kay	Philipburg, Que.
113	White Legged Kirsty	21958	9,526·6	359·27	3·77	365	Frank H. Harris	Mt. Elgin, Ont.
117	Star's Sarah	21541	10,651·94	407·4	3 82	365	John McKee	Norwich, Ont.
118	Briery of Springbank	29616	10,172·9	376·63	3.70	325	A. S. Turner & Son	Ryckman's Cor. O,
130	Snowdrop of Hickory Hill.	23599	8,527·2	345·97	4·05	365	N. Dyment	Rural Route No. 2. Hamilton, Ont.

COWS, THREE YEARS OLD AND UNDER FOUR—*Concluded.*

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
138	Ethel of Stockwell	29638	8,861·25	355·18	4·00	338	Hon. W. Owens	Montebello, Que.
140	Maud of Ste. Annes	25979	7,828·75	286·84	3·66	342	Macdonald College	Macdonald Col., Q.
145	Flavia 2nd of Ottawa	22197	8,413·5	348 53	4·14	331	Dir. Exp. Farms	Ottawa, Ont.
148	Madge	27700	7,271·	333·24	4·58	320	Wooddisse Bros	Rothsay, Ont.
160	Dewdrop of Menie	25875	9.783·	401·46	4·10	295	Wm. Stewart & Son	Menie, Ont.
161	Lass O'Gowrie	25190	6,896·5	279·16	4·04	333	"	"
163	Stony Croft Lady Helen	25225	8,602·	258·96	4·17	302	Alex Hume & Co.	"
166	Flower of Sardis	26539	6,760·25	247·52	3·66	323	Jos. Thompson	Sardis, B.C.
174	Dairy Miss	24722	7,631·	318·21	4·17	365	And. McRae	East Royalty, P.E.I.
177	Coquette of Lakeside	26685	7,609·5	303·18	3·97	350	G. H. Montgomery	Philipsburg, Que.
178	Barcheskie Derby 6th	28548	7,206·	296·22	4·10	337	"	"
181	Grace	27602	7,721·9	301·85	3·9	302	A. S. Turner & Son	Ryckman's Corners, Ont.
183	Scottie's Victoria	23675	10,057·5	389·56	3·87	314	John McKee	Norwich, Ont.
186	Scottie's Dandy 2nd	25690	7,317·9	289·78	3·96	293	"	"
189	Jemima of Springbank 2nd	29618	8,265·05	311·99	3·77	243	A. S. Turner & Son	Ryckman's Corners, Ont.
194	College Merry Maid	28776	8,371·75	321·62	3·08	365	N.S. Agric. College	Truro, N.S.
197	Lady Minto 2nd	24159	7,716·6	321·01	4·16	290	W. J. Carlyle	Chesterville, Ont.
198	Oddity	27699	9,030·25	383·62	4·24	365	Wooddisse Bros	Rothsay, Ont.
204	Mabel of Riverside	26320	9,432·	375·54	3·98	365	G. D. Mode	Vankleek Hill, Ont

COWS, TWO YEARS OLD AND UNDER THREE.

2	Lady Clare of Burnside	22293	7,959·75	307·8	3·87	299	R. R. Ness	Howick, Que.
4	Barcheskie Lucky Girl	21363	8,710·25	350·08	4·00	313	"	"
9	Susie of Hickory Hill	22336	6,410	302·14	4·71	385	N. Dyment	Clappison, Ont.
10	Monkland Dorothy	21370	6,046·75	245·38	4·07	292	R. R. Ness	Howick, Que.
13	Minnie of Elm Shade	18883	7,533·5	238·23	3·76	290	H. Gordon	"
14	Finlayson Rose	21369	7,163	285·15	3·98	335	R. R. Ness	"
16	Barcheskie Sybil	25326	6,080	270·9	4·15	296	H. Gordon	"
18	Isaleigh Nancy 1st	20525	7,439	276·1	3·71	341	J. N. Greenshields	Danville, Que.
19	Stadacona Lily	19257	6,228	236·27	3·79	300	G. A. Langelier	Cap Rouge, Que.
25	Sunnymead Princess	19360	6,748	295·16	4·37	360	W. D. Parker	Hatley, Que.
26	Adalia 2nd	22949	9,924	366·97	3·70	365	E. Cohoon	Harrietsville, Ont.
28	Isaleigh Claribella 2nd	23712	8,454·75	322·55	3·80	365	J. N. Greenshields	Danville, Que.
30	Lady Brant of Neidpath	21463	6,631	303·99	4·58	319	W. W. Ballantyne	Stratford, Ont.
31	Daisy Queen 2nd	22950	6,644·6	250·18	3·76	345	E. Cohoon	Harrietsville, Ont.
32	Stadacona Silver Queen	20043	6,373	303·38	4·76	340	G. A. Langelier	Cap Rouge, Que.
34	Annie of Warkworth	21493	6,689·25	284·49	4·25	365	Alex. Hume	Menie, Ont.
35	Adalia 3rd	22948	8,845·55	326 46	3·69	365	E. Cohoon	Harrietsville, Ont.
36	Rosebud	22305	7,982·5	280·1	3·51	365	Jos. Thompson	Sardis, B.C.
37	Ruby Royal of the Hills	23373	6,615·5	276·45	4·24	365	A. C. Wells & Son	"
39	Dolly Dutton of Ste. Anne's 2nd	23374	6,290	287·72	4·57	334	"	"
46	Bessie 16th of Neidpath	21468	7,625	330·72	4·34	358	W. W. Ballantyne	Stratford, Ont.
51	Neidpath Rose 10th	21459	6,442·2	295·99	4·60	355	"	"
53	Daisy of Westland	21799	6,950	316·77	4·55	355	G. A. Langelier	Cap Rouge, Que.
54	Scotia Jean	24130	5,880·25	244·98	4·16	335	W. W. Bowley	Napperton, Ont.
56	Ardyne Carntyne	26349	7,019·75	312·93	4·45	365	R. Hunter & Sons	Maxville, Ont.
57	Auchenbrain White Rose	26348	6,618	278·82	4·21	363	"	"
61	Madeline B	23601	7,135·5	292·96	4·10	365	Jas. Begg	St. Thomas, Ont.
62	Sybella of Springbrook	27691	7,305·9	302·24	4·13	226	A. S. Turner	Ryckman's Cor., Ont.
63	Princess	23581	6,778·75	292	4·30	365	Wooddisse Bros	Rothsay, Ont.
65	Jemima of Springbank	27689	8,839·5	395·33	4·47	338	A. S. Turner	Ryckman's Cor., Ont.
66	Isaleigh Miss Sandy	23827	6,744	288·75	4·28	365	G. A. Langelier	Cap Rouge. Que.
69	Lucy 4th	25101	5,782	259·29	4·50	329	W. H. Tran	Cedar Grove, Ont.
79	Hot Scotch Lassie	23704	6,066	258·61	4·26	328	F. H. Harris	Mt. Elgin, Ont.
87	Madge	27700	6,663·75	301·6	4·52	346	Wooddisse Bros	Rothsay, Ont.
89	Bessie 18th of Neidpath	24610	6,461·1	293·5	4·57	352	W. W. Ballantyne	Stratford, Ont.
90	Lady Betty	23604	7,182	302·71	4·21	365	James Begg	St. Thomas, Ont.
91	Bonny	24357	7,288	322·79	4·43	365	"	"
95	Beauty of Hickory Hill	27663	7,397·75	281·54	3·70	358	N. Dyment	Rural Route No. 2, Hamilton, Ont.

COWS, TWO YEARS OLD AND UNDER THREE—*Concluded.*

R. & P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent. of Fat.	Days in Milk.	Owner.	Address.
98	Clara of Hillview	24460	6,844·5	275·36	4·02	365	W. L. Center	Innisfail, Alta.
99	Laura Belle	27772	6,001·5	238·77	3·98	365	"	"
100	Southwick Lily 5th	28539	5,662·25	248·34	4·38	365	Geo. Hay	Howick, Que.
101	Southwick Kirsty 8th	28538	5,833·5	229	3·92	365	"	"
103	Prim of the Willows	26879	6,104·5	237·24	3·88	357	P. D. McArthur	North Georgeto'n, Que.
104	Prima Dona	24434	7,191·7	284·67	3·96	334	Frank H. Harris	Mt. Elgin, Ont.
108	Stonehouse Pansy 3rd	25309	6,833	262·31	3·83	365	Jos. Thompson	Sardis, B.C.
109	Rosebud's Gem	26533	7,040·5	265·42	3·77	299	"	"
112	Oddity	27699	7,222·25	297·56	4·12	365	Wooddise Bros	Rothsay, Ont.
114	Minnie of Hillcrest	27745	6,450·6	279·85	4·34	338	Frank H. Harris	Mt. Elgin, Ont.
116	Scottie's Nancy	24265	6,501·17	269·15	4·14	320	John McKee	Norwich, Ont.
120	Snowflake of Spring Brook	25750	6,315·75	266·42	4·37	285	G. D. Mode	Vankleek Hill, Ont
123	Barcheskie Winflower	28533	6,065·35	261·16	4·30	333	George Hay	Howick, Que.
124	Speck of Springbank	29619	10,353·65	437·39	4·20	365	A. S. Turner & Son	Ryckman's Cor., Ont.
125	Scottie's Lassie	24264	6,771·2	234·41	3·46	339	John McKee	Norwich, Ont.
127	Ruby of Springbank	29622	9,368·85	384·77	4·10	337	A. S. Turner & Son	Ryckman's Cor., Ont.
131	Peggy Murphy	27252	7,875·7	274·28	3·48	325	John McKee	Norwich, Ont.
136	Neidpath Rose 13th	27620	6,630·5	294·62	4·45	365	W. W. Ballantyne	Stratford, Ont.
137	Burnside Lucky Girl 2nd	30847	8,408·75	305·28	3·63	365	R. R. Ness	Howick, Que.
139	Maud 2nd of Ste. Annes	27297	7,019·5	282·53	4·02	320	Macdonald College	Macdonald Col'ge, Que.
142	Annie Laurie 3rd	27957	7,728·6	284·93	3·68	365	W. W. Ballantyne	Stratford, Ont.
144	Scottie's White Wings	24266	6,933·7	247·38	3·56	328	H. & J. McKee	Norwich, Ont.
146	Ottawa Kate	29601	9,017·	339·45	3·76	365	Dir. Exp. Farms	Ottawa, Ont.
157	Holehouse Flirt of Trout Run	27033	10,298·5	433·72	4·21	365	Wm. Thorn	Lynedock, Ont.
158	Lessnessock Sprightly	26345	7,405·	260·35	3·51	322	Alex. Hume & Co.	Menie, Ont.
162	Milkmaid 7th	28769	11,673·5	492·75	4·22	365	And. McRae	East Royalty, P. E.I.
165	Lang Legget Kirsty	26541	6,602·	265·18	4·16	345	Wm. Stewart & Son	Menie, Ont.
167	Fairview Lassie	26531	10,464·	381·74	3·65	353	Jos. Thompson	Sardis, B.C.
168	Fairview Nora	26532	6,972·5	265·91	3·95	313	" "	"
169	New Year	29577	7,445·5	350·10	4·7	365	Wooddisse Bros	Rothsay, Ont.
170	Nola of Craigielea	29803	6,092·25	247·20	4·05	337	H. C. Hamill	Box Grove, Ont.
175	Mollie Bawn	28376	5,910·75	236·30	4·00	365	And. McRae & Sons	East Royalty, P. E.I.
179	Ayrshire Beauty of Trout Run	27034	8,008·45	313·24	3·91	365	Wm. Thorn	Lynedock, Ont.
184	Burnside Pearl 4th	27181	6,471·	254·41	3·93	292	R. R. Ness	Howick, Que.
185	Burnside Silver Bell	34664	6,487·75	262·62	4·04	287	"	"
188	Helena of Springbank	30215	6,764·55	278·01	4·11	289	A. S. Turner & Son.	Ryckman's Corners, Ont.
191	Lessnessock Queen Bee	30581	6,163·	243·44	3·94	303	Robt. Hunter & Son	Maxville, Ont.
192	Scottie's Victoria 2nd	25906	8,359·9	322·82	3·86	365	John McKee	Norwich, Ont.
193	Ravensdale Flirt	26652	6,672·	257·47	3·85	317	W. F. Kay	Philipsburg, Que.
196	Christmas Belle	25958	7,684·9	265·67	3·46	330	E. Cohoon	Harrietsville, Ont.
203	Scottie's Nancy 2nd	27253	8,387·4	343·56	4·10	295	John McKee	Norwich, Ont.
208	Briery 2nd of Springbank	32137	14,131·35	520·49	3·68	365	A. S. Turner & Son.	Ryckman's Corners, Ont.
209	Butter Maid of Craiglea	29940	11,392·45	480·33	4·21	365	" "	" "
213	Queen of Meadowvale	26982	6,176·75	237·55	3·84	362	N.S. Agric. College	Truro, N.S.

FRENCH CANADIAN—COWS FIVE YEARS OLD AND OVER.

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
1	Fancy	6252	7,425·75	318·8	4·30	334	T. B. Macaulay	Hudson Heights, Q
4	Fortune	757	7,158·25	330·48	4·61	302	"	"
5	Reine 2ème	1319	8,607·5	312·66	3·63	276	Sylvestre Frères	Clairvaux, Que.
6	Caprera	1662	7,635·5	312·16	4·09	340	"	"
7	Inoquette	871	7,876·	377·57	4·80	365	Director Experimental Farms.	Ottawa, Ont.
9	La Poupée	875	6,963·	335·21	4·81	330	"	"
10	Zamora	242	7,668·	403·05	5·25	330	"	"
12	Lyster II	1235	7,887·	322·26	4·08	287	C. N. Lyster	Kirkdale, Que.
	COWS FOUR YEARS OLD AND UNDER FIVE.							
8	La Belle	869	7,196·	357·48	4·96	345	Director Experimental Farms.	Ottawa, Ont.
	COWS THREE YEARS OLD AND UNDER FOUR.							
13	Orange Blossom	886	6,192·25	308·79	4·98	291	T. B. Macaulay	Hudson Heights, Q
	COWS TWO YEARS OLD AND UNDER THREE.							
2	Garceau 3	6502	5,090·43	207·08	4·10	365	G. Garceau	Pointe du Lac, Que
3	Douarnenaise	1020	4,724·25	221·91	4·70	284	T. B. Macaulay	Hudson Heights, Q
5	Orange Blossom	886	5,333·5	280·55	5·26	365	"	"
11	Alert	1243	6,618·95	276·58	4·18	365	C. N. Lyster	Kirkdale, Que.
14	Douarnenaise	1020	6,006·75	292·25	4·86	313	T. B. Macaulay	Hudson Heights, Q
15	Winnie	1844	5,293·81	247·63	4·67	365	C. N. Lyster	Kirkdale, Que.
16	Jane	1843	4,977·69	230·26	4·62	365	"	"

GUERNSEY—COWS FIVE YEARS OLD AND OVER.

2	Lady Heiress of Deutonia	325	8,925·	430·74	4·82	365	Howard W. Corning.	Chegoggin, N.S.
	CLASS FOUR YEARS OLD.							
1	Dorothy's Heiress	120	8,085·5	495·74	6·13	365	Howard W. Corning.	Chegoggin, N.S.
	CLASS THREE YEARS OLD.							
3	Beauty of Hillside	64	7,394·5	384·9	5·20	326	Howard W. Corning.	Chegoggin, N.S.
	CLASS TWO YEARS OLD.							
4	Dairymaid of Hillside	125	9,352·	464·2	4·96	365	Howard W. Corning.	Chegoggin, N.S.
5	Buttercup of Hillside	217	7,056·5	394·35	5·58	365	Howard W. Corning.	Chegoggin, N.S.
6	Dona Clatina	172	6,096·5	333·53	5·47	360	Director Experimental Farms	Ottawa, Ont.
7	Dairy Queen of Hillside	123	5,447·	291·15	5·34	319	Howard W. Corning.	Chegoggin, N.S.

SESSIONAL PAPER No. 15b

HOLSTEIN-FRIESAN—COWS FIVE YEARS OLD AND OVER.

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
2	Madam Dot 3rd's Pauline DeKol.	3706	11,518·7	438·57	3·80	303	N. Sangster	Ormstown, Que.
4	Dorliska Willis	4817	11,014·25	396·8	3·60	325	Geo. H. Caughell..	Aylmer, Ont.
5	Maggie Dorliska	7259	11,644·5	393·19	3·42	350	" ..	"
7	Malahide Princess	4615	10,621·75	402·7	3·80	350	" ..	"
8	Evergreen March	3896	15,239·25	556·7	3·65	305	G. W. Clemons...	St. George, Ont.
14	Netherland Aaggie	2478	13,545·5	439·26	3·24	325	J. M. Van Patter.	Luton, Ont.
18	Netherland Tensen	3423	15,023·5	473·62	3·15	365	A. E. Smith & Son	Millgrove, Ont.
21	Rosa Lee DeKol	3127	13,990 5	479·28	3·42	365	B. Mallory	Belleville, Ont.
22	Snowflake Queen DeKol of Minster.	4535	13,089·	443·24	3·38	365	R. Honey	Brickley, Ont.
23	Sarah Jane 2nd	3604	11,428·5	426·54	3·73	364	W. J. Bailey	Nober, Ont.
31	Madam Dot 3rd's Pauline DeKol.	3706	12,734·1	487·23	3·82	365	N. Sangster.	Ormstown, Que.
33	Bontje Paul.	2660	13,011·7	445·83	3·43	333	"	"
35	Vida Princess 3rd	2774	14,649·6	438·1	3·00	363	J. M. Van Patter.	Luton, Ont.
36	Vida Princess 4th	2775	18,402·75	602·6	3·26	365	" ..	"
41	Netherland Aaggie DeKol.	6439	21,666·	704·8	3·25	365	" ..	"
46	Lady Elgin A	4918	11,487·2	442·5	3·85	365	F. Leeson	Aylmer, Ont.
47	Edna Wallace	3505	16,367·8	542·6	3·31	365	"	"
57	Lilly Westwoud 2nd	3966	11,593·3	370·	3·19	323	Thos. Hartley	Downsview, Ont.
60	Bell DeKol Queen 2nd	3523	15,447·25	495·29	3·20	344	H. Bollert	Cassel, Ont.
63	Spotted DeKol Lady	8118	13,212·25	473·12	3·57	352	S. Lemon	Lynden, Ont.
64	Sevangeline 2nd	4340	10,655·	373·1	3·50	300	"	"
69	Bertha Black	2327	15,224·27	530·	3·48	327	Otto Suhring	Sebringville, Ont.
72	Springbrook Queen	1302	11,565·18	363·	3·14	360	S. Lemon	Lynden, Ont.
73	Countess Carrie Mercedes.	8102	13,400·	383·3	2·86	347	"	"
76	Trenton Pride	3491	12,792·4	378·61	2·96	332	B. Mallory	Belleville, Ont.
78	Rideau Della, Princess DeKol.	4612	15,069·7	464·33	3·08	305	C. Duff. Nelles	Boston, Ont.
80	Shawasse Beauty 2nd	12157	13,694·3	400·36	3·21	365	H. Bollert	Cassel, Ont,
84	Rosa Belle B	2275	11,337·5	375·22	3·25	315	David McDonald.	Trenton, Ont.
85	Carrie May	4179	11,689·5	369·61	3·16	365	F. E. Came	St. Lambert, Que.
86	Helbon Spink's Netherland Lass.	2971	12,475·87	423·22	3·39	358	S. Lemon	Lynden, Ont.
87	Jossie Bewunde Posch	5281	15,439·5	463·81	3·00	365	E. Laidlaw & Sons	Aylmer West, Ont.
91	Fairy	4423	14,344·25	425·26	2·96	304	O. D. Bales	Lansing, Ont.
92	Hyacinth	3603	13,864·5	453·7	3·26	335	"	"
94	Centre View's Gem 2nd	5246	11,438·45	366·22	3·20	365	Robt. J. Miller	Fonthill, Ont.
96	Princess of Wellesley	3042	11,401·5	364·54	3·19	311	L. H. Lipsitt	Straffordville, Ont.
99	DeKol Plus	10753	22,304·	764·94	3·43	365	S. J. Foster	Bloomfield, Ont.
100	Countess Calamity Clay A.	4971	14,815·	424·59	2·866	305	"	"
104	Erie Girl 2nd	5345	11,851·	382·97	3·23	334	W. M. Gibson	Winnipeg, Man.
105	Nokomis	6692	13,156·8	427·86	3·25	365	W. J. Cowie	Locust Hill, Ont.
106	Kitty Marling DeKol	5676	13,529·6	441·39	3·26	357	N. Sangster	Ormstown, Que.
110	Rosa Omega	3490	12,181·6	372·585	3·05	305	B. Mallory	Belleville, Ont.
111	Ruby A	1812	13,633·5	413·22	3·03	345	F. Leeson	Aylmer, Ont.
116	Helena Hengerveld DeKol.	4337	16,302·62	534·81	3·28	365	A. D. Foster	Bloomfield, Ont.
118	Maud Bessie DeKol.	4384	15,240·75	433·74	2·84	365	S. M. Peacock	Mt. Salem, Ont.
122	Winnie Westwoud	3968	11,210·1	364·09	3·25	291	Thos. Hartley.	Downsview, Ont.
124	Gladiolus	4037	14,113·31	469·78	3·32	365	John McKenzie	Willowdale, Ont.
126	Mayfield Hilda	3343	13,096·65	451·19	3·44	365	W. J. Cowie.	Locust Hill, Ont.
128	Tempest Clothilde Mercedes.	5327	18,447·9	600·31	3·25	365	Thos. Hartley	Downsview, Ont.
129	Fanny Fern	2946	10,732·75	369·05	3·439	320	E. Laidlaw & Son.	Aylmer West, Ont.
131	Flora Wayne of Riverside.	2414	14,692·	469·416	3·195	313	N. S. Agricultural College.	Truro, N.S.
136	Ferndale Maid	6953	17,162·43	607·54	3·54	343	John Brown	Stamford, Ont.
139	Aaggie Mechlin	3561	13,190·75	415·86	3·15	349	N. S. Agricultural College.	Truro, N.S.
141	Johanna Netherland DeKol	4290	16,687·95	548·88	3·29	365	Miss G. E. Peacock	Mt. Salem, Ont.
144	Beauty's Buffalo Girl	3562	16,820·9	554·86	3·30	365	Tig. Wood	Mitchell, Ont.
147	Lilly Westwoud	3966	13,738·37	448·75	3·26	302	Thos. Hartley	Downsview, Ont.
150	Queen's Artis Peer	10200	12,609·9	398 62	3·24	342	Edgar Dennis	Newmarket, Ont.
151	Netherby Queen Jane	4336	12,318·1	444·15	3·60	228	S. G. Carlyle	Chesterville, Ont.
158	Aaggie DeKol Witzyde	6440	13,709·75	446·79	3·25	335	J. M. VanPatter	Aylmer, Ont.
166	Patsy 4th's Axie DeKol	9739	13,446·56	453·33	3·37	315	Thos. Hartley	Downsview, Ont.
172	Amy Peep 3rd	5513	13,607·05	471·89	3·46	365	J. W. McCormick.	Morewood, Ont.

, COWS, FIVE YEARS OLD AND OVER—*Concluded.*

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
174	Georgie	5742	12,299·27	393·74	3·21	341	J. B. Arnold	Easton's Corners, Ont.
175	May DeKol Queen	4343	13,588·05	445·66	3·28	363	"	"
176	Rooker's Jongste Tensen	4075	12,950·25	414·04	3·19	365	R. Honey	Brickley, Ont.
180	Hengerveld Docia	5512	10,708·56	397·52	3·72	330	J. W. McCormick.	Moorewood, Ont.
186	Mercedes Jewel	6219	11,751·4	382·79	3·25	287	Monro & Lawless.	Thorold, Ont.
188	Rose of Alnwick	4435	12,639·6	399·8	3·16	365	J. S. Honey	Cherrywood, Ont.
189	Helena Pietertje's Pauline	4371	17,555·62	534·48	3·04	337	S. J. Foster	Bloomfield, Ont.
191	Sadie Queen	4390	13,395·25	439·10	3·27	322	"	"
196	Jean F. DeKol	5480	15,654.6	523·64	3·34	362	S. G. Carlyle	Chesterville, Ont.
198	Kate Castleton	4512	18,713·5	580·58	3·10	365	F. S. Passmore	Brantford, Ont.
203	May Echo	3372	23,707·	833·64	3·51	365	F. R. Mallory	Frankford, Ont.
209	Pauline Aaggie DeKol II.	5889	11,647·43	436·8	3·7	357	J. W. McCormick.	Morewood, Ont.
215	Alice Neilson	4222	10,731·18	361·17	3·37	300	S. Lemon	Lynden, Ont.
216	Sevangeline 2nd	4340	11,362·7	436·59	3·8	313	"	"

COWS FOUR YEARS OLD AND UNDER FIVE.

1	Rhoda's Queen	4832	12,597·9	422·76	3·55	270	N. Sangster	Ormstown, Que.
9	Ruth Tensen DeKol	6940	13.289·	407·13	3·06	320	A. E. Smith & Son	Millgrove, Ont.
16	Lucretia Borgia	4432	10,697·25	419·73	3·92	313	G. W. Clemons.	St. George, Ont.
19	Glenside Nerissa	5395	12,459·4	397·6	3·19	342	G. H McKenzie	Thornhill, Ont.
20	Glenside Laura	5394	11,651·2	341·21	2·93	335	"	"
40	Johanna Netherland DeKol.	4290	14,043·25	473·81	3·37	340	Miss G. E. Peacock	Mt. Salem, Ont.
45	Vera H	4999	14,107·5	464·	3·29	365	F Leeson	Aylmer, Ont.
54	Lulu Glaser	5099	12,499·98	463·17	3·70	260	S. Lemon	Lynden, Ont.
56	May Echo Pietertje	4606	11,720·5	358·25	3·06	335	B. Mallory	Belleville, Ont.
59	Lina Netherland Abbekerk.	12158	12,773·31	419·78	3·28	288	H. Bollert	Cassel, Ont.
77	Daisy Verbelle	5079	12,268·8	412·29	3·36	360	B. Mallory.	Belleville, Ont.
81	Jessie Inka Keyes	6291	12,860·5	417·73	3·24	362	J. A. Caskey	Madoc, Ont.
83	Betsy's Pearl	5733	16,759·	504·39	3·00	330	A. A. Johnston	Straffordville, Ont.
112	Daisy Pietertje Johanna	6190	14,237·16	523·75	3 67	348	D. C. Flatt & Son.	Millgrove, Ont.
113	Faforit 10th's Beauty	5622	13,337·	417·59	3·13	365	A. E. Smith & Son.	"
121	Daisy Jane	6057	12,828·	455·23	3·55	295	Thos. Hartley	Downsview, Ont.
125	Prokula DeKol	6635	12,550·8	413·36	3·30	303	Tig. Wood	Mitchell, Ont.
134	Pearl's Lady Acme	5725	11,789·5	358·32	3·04	365	R. O. Morrow	Hilton, Ont.
149	Queen Netherland Peer	10201	15,253·8	447·08	2·93	361	Edgar Dennis	Newmarket, Ont.
156	Winnie R. Calamity Posch.	7221	14,324·	471·319	3·29	365	E. F. Osler.	Bronte, Ont.
162	Irene Fairmont	6858	13,690·36	420·56	3·07	335	F. I. Burrill	Holbrook, Ont.
165	Bess DeKol	6738	14,101·75	435·37	3·08	265	John C. Brown	Stamford, Ont.
185	Julia Posch Abbekerk	7911	11,241·2	377·09	3·35	323	Monro & Lawless.	Thorold, Ont.
185	Agatha Houwtje DeKol.	7968	12,576·8	406·61	3·23	365	"	"
190	Daisy Pauline Pietertje	7042	15,158·62	494·8	3·19	306	S. J. Foster	Bloomfield, Ont.
200	Nellie's Pet	7489	12,677·	421·03	3·32	289	Tig Wood	Mitchell, Ont.
206	Aaggie DeKol	7928	13,119·37	513·54	3·91	338	J. W. McCormick.	Moorewood, Ont.
212	Fancy B. Posch	8428	10,403·06	411·32	3·9	275	Richard Clark	Henfryn, Ont.
220	Tillie Acema	6775	12,666·6	429·3	3·33	365	H. J. Allison.	Chesterville, Ont.
221	Quora 4th	6372	14,850·	447·87	3 01	328	"	"
222	Rideau Pietertje DeKol	8594	12,144·1	395·55	3·25	303	C. Duff Nelles	Boston, Ont.
229	Princess Netherland Pride.	17025	11,758·25	406·42	3·45	337	J. W. McCormick.	Moorewood, Ont.
232	Fanny Iosco Pride	7686	12,273·8	419·7	3·41	362	Thos. Hartley	Downsview, Ont.

COWS THREE YEARS OLD AND UNDER FOUR.

10	Bonnie Tensen	5818	13,215·5	436·5	3·30	365	O. D. Bales	Lansing, Ont.
11	Helbon DeKol	5631	16,346·	568·47	3·48	365	E. Laidlaw & Sons	Aylmer, Ont.
25	May Echo Verbelle.	5320	10,867·	345.7	3·18	322	B. Mallory	Belleville, Ont.
44	Verona	6419	10,080·1	310·27	3·07	322	N. Sangster	Ormstown, Que.
42	Faforit Butter Girl	5870	13,272·3	428·3	3·22	342	Thos. Hartley	Downsview, Ont.
43	Nierop Netherland Bess 2d	6694	13,052·8	434·14	3·32	360	"	"
50	Sherwood Edna's Faforit	6199	12,605·25	394·73	3·13	365	C. H. Shaver	Davisville, Ont.
55	Julia Arthur 2nd.	6977	9,019·	312·17	3·46	365	G. W. Clemons	St. George, Ont.
61	Maple Grove Belle 2nd	6540	12,594·47	419·02	3·33	330	H Bollert	Cassel, Ont.
62	Luella Tensen	8456	13,504·6	374·09	2·77	336	S. Lemon	Lynden, Ont.

SESSIONAL PAPER No. 15b

COWS, THREE YEARS OLD AND UNDER FOUR—*Concluded.*

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
66	Seymour Mechthilde DeKol	5974	10,867·	364·38	3·35	350	J. A. Caskey	Madoc, Ont.
67	Jesse DeKol Echo.....	6295	12,905·	383·56	2·97	365	"	"
82	Canaan Sherwood Orpha...	7298	9,358·5	297·28	3·17	365	F. E. Came	Ahuntsic, Qué.
90	Sally Snow.....	6996	9,8S2·2	395·78	4·015	362	N. Sangster.....	Ormstown, Qué.
93	Winnie Calamity Posch....	6502	9,691·55	311·96	3·23	319	R. J. Miller	Fonthill, Ont.
95	Lady Grey of Ormstown...	7617	9,331·5	303·78	3·25	273	N. Sangster.....	Ormstown, Que.
101	Genista.....	7180	12,694·75	391·19	3·08	309	A. A. Johnston...	Straffordville, Ont.
107	Cosey of the Old Farm.....	7110	11,709·25	392·89	3·35	320	M. N. Matthews..	Luton, Ont.
119	Bessie Jane DeKol	7365	11,977·95	395·19	3·30	365	S.M. Peacock.....	Mt. Salem, Ont.
123	Fairy Winsumer	6854	11,496·65	377·659	3·286	365	Thos. Hartley	Downsview, Ont.
127	May Flower Posch	7549	10,132·4	333·45	3·29	309	N. Sangster.....	Ormstown, Que.
132	Nellie's Pet.....	7489	10,548·3	362·31	3·43	302	Tig. Wood	Mitchell, Ont.
133	Quora 4th.....	6372	10,021·2	311–81	3·11	358	R. O. Morrow....	Hilton Ont.
135	Sylvia.....	7765	13,456·5	420·93	3·12	320	U. E. Wartman...	Warkworth, Ont.
137	Bonnie Pauline Jane	8174	12,993·05	427·3	3·29	860	Miss G.E. Peacock	Mt. Salem, Ont.
140	Helbon DeKol 2nd.....	8511	14,889·5	526·37	3 53	365	E. Laidlaw & Son.	Aylmer West, Ont.
154	Helena Hengerveld Keyes..	7396	13,328·275	411·61	3·09	305	A. D. Foster.	Bloomfield, Ont.
155	Korndyke Pietertje Keyes.	7395	13,239·625	425·03	3·21	305	"	"
159	Aaggie Mercedes.....	7667	13,443·75	475·56	3·53	365	J. M. Van Patter.	Aylmer, Ont.
163	Dandy DeKol Isabella	7695	9.783·95	281·60	2·88	332	F. I. Burrill.....	Holbrook, Ont.
169	Fancy B. Posch.	8428	9,145·75	357·82	3·91	264	R. Clarke.....	Henfryn, Ont.
173	Desta.....	8082	18,993·39	568·32	2·99	365	J. B. Arnold.....	Easton's Corners, Ont.
179	Princess Susie of Malahide.	8085	12,167·	434·75	3·57	302	E. Laidlaw & Sons	Aylmer West, Ont.
181	Brooklands Korndyke Wayne.	9517	11,545·68	408·77	3·54	365	J. W. McCormick.	Morewood, Ont.
184	Pontiac Lula	9853	11,882·	376·47	3·16	335	Monro & Lawless.	Thorold, Ont.
202	Niagara Maid.....	9353	13,650·	511.31	3·74	365	John C. Brown....	Stamford, Ont.
208	Korndyke Pauline DeKol..	9320	9,501·37	357·46	3·7	347	J. W. McCormick.	Morewood, Ont.
213	Korndyke DeKol Daisy....	10317	10,034·31	369·59	3·68	251	R. Clarke	Henfryn, Ont.
219	Cloverleaf Faforit Mercena.	9147	14,281·5	456·36	3·19	365	A. E. Smith & Son	Millgrove, Ont.
226	Manor DeKol Netherland.	9608	10,397·5	462·82	4·45	365	J. W. McCormick.	Morewood, Ont.
227	Madam B. 2nd's Pauline...	9218	9,590·55	332·74	3·46	363	R. W. Walker....	Utica, Ont.
230	Violet's Daisy's Pauline....	9132	11,470·75	423·90	3·7	310	Dr. John Watson.	Howick, Que.

COWS TWO YEARS OLD AND UNDER THREE.

3	Verona	6419	8,788·2	294·99	3·34	319	N. Sangster	Ormstown, Que.
6	Dorthy Dorliska..... ..	5285	9,407·5	335·98	3·57	327	G. H. Caughell..	Alymer, Ont.
12	Wopke Posch	7406	7,870·87	287·38	3 65	318	E. Laidlaw & Son.	"
13	Ina Pauline Mercedes.....	6063	12,060·37	454·65	3·59	359	H. Bollert.....	Cassel, Ont.
15	Beulah Colantha.....	6907	9,030·1	296·79	3·28	365	N. Sangster.....	Ormstown, Que.
17	Rose DeKol Teake.....	6976	9,366·15	306·5	3·27	312	G. W. Clemons...	St. George, Ont.
26	Bell Tensen.....	6736	10.927·	350·49	3·20	325	Wm. E. Mason...	Tyrrell, Ont.
17	Minnie Springbrook.....	6735	10,121·	307·98	3·04	296	"	"
28	Queen DeKol of Minster...	6001	9,420·75	301·5	3·20	365	R. Honey	Brickley, Ont.
29	Cosey of the Old Farm.....	7110	11,162·	383·6	3·43	365	M. N. Matthews..	Luton, Ont.
30	Madeline 2nd.	7616	10,121·8	365·69	3·61	365	N. Sangster..	Ormstown, Que.
32	Lady Grey of Ormstown...	7617	9,432·6	312·7	3·31	365	"	"
37	Aggie Schuiling DeKol ...	6442	13,283·5	410 14	3·08	365	J. M. Van Patter..	Luton, Ont.
38	Netherland DeKol Witzyde	7665	11,907·	385·33	3 23	322	" "	"
39	Aggie DeKol Schuiling....	7666	10,831·5	354·6	3·27	365	" "	"
44	Bessie DeKol Tensen.....	7852	10,184·5	315·78	3·10	345	W. E. Mason.....	Tyrrell, Ont.
48	Lady Elgin J.	5761	9,679·3	315·81	3·26	330	F. Leeson.....	Alymer, Ont.
49	Evaline DeKol.....	9110	13,146·4	419·1	3·18	365	"	"
51	Seymour Jessie.....	7307	9,072·75	296·18	3·26	365	W. E. Hermiston.	Brickley, Ont.
52	Mary Anderson 3rd.....	7262	9,385·5	358·47	3·82	358	G. W. Clemons..	St. George, Ont.
53	Laura Albino DeKol.....	7344	9,074·75	269·02	2·90	365	R. Honey.....	Brickley, Ont.
58	Lucy Staples.....	7850	10,321·5	381·96	3·70	342	Wm. E. Mason....	Tyrrell, Ont.
65	Aaggie Mercedes...	7067	11,745·	399·8	3·40	365	J. M. Van Pater..	Luton. Ont.
68	Princess Helen DeKol	7983	10,997·5	328·18	2·98	328	Issac Bateman....	Innisfall, Alta.
70	Lassie Artis Johanna.....	10846	11,231·75	322·86	2·88	303	G. A. Brethen....	Norwood, Ont.
71	Mayflower Posch.....	7549	8,852·3	296·72	3·35	332	N. Sangster.....	Ormstown, Que.
74	Canaan Queen	7264	10,106·75	318·4	3·15	365	F. E. Came.....	Ahuntsic, Que.
75	Maggie Verbeille....	7860	10,629·9	329·84	3·10	350	B. Mallory.....	Frankfort, Ont.
79	Faforit of Downsview.....	7936	10,854·5	383·56	3 53	356	Thos. Hartley....	Downsview, Ont.
88	Pauline Texal.....	9646	13,283·	422·6	3·18	365	E. Laidlaw & Sons	Alymer West, Ont.
89	Princess Susie of Malahide.	8085	11,273·25	381·03	3·38	335	" "	" "

COWS TWO YEARS OLD AND UNDER THREE— *Concluded.*

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Address.
97	Jenny Bonerges Ormsbv...	8216	16,849·16	666·32	3·95	365	D. C. Flatt & Sons	Millgrove, Ont.
98	Seymour Rose DeKol.....	8975	8,800·	275·75	3·13	365	Wm. E. Herniston	Brickley, Ont.
102	Jolie DeKol	8558	10,142·62	335·33	3·30	315	Jean Chiasson....	Rustico, P.E.I.
103	May Flower Gyspy.....	8546	9,594·	298·07	3·10	365	Isaac Bateman....	Innisfail, Alta.
108	Korndye Pet.....	10532	8,334·	318·67	3·82	304	John Marks.....	Norwood, Ont,
109	Meadowlane Lassie.....	10565	9,369·4	313·65	3·34	355	B. Mallory.....	Belleville, Ont.
114	Ida Mechtilde DeKol.....	8783	11,208·	373·73	3·33	365	G. H. McKenzie..	Thornhill, Ont.
115	Lady Faforit Posch.....	8949	10,593·6	385·84	3·64	365	" "	" "
117	Aaggie DeKol Mercedes...	8351	8,985·	295·6	3·29	355	J. M. Van Patter.	Alymer, Ont.
120	Maud Holland DeKol.....	7478	8,879·5	335·65	3·78	365	" "	"
130	Belle Dewdrop 5th...	8514	14,058·	450·46	3·20	365	E. Laidlaw & Sons	Alymer West, Ont.
138	Della 2nd.....	8353	12,854·5	459·6	3·575	365	" "	Alymer, Ont.
142	Mercedes May.....	8302	9,055·25	291·19	3·21	365	Wm. Watson.....	Pine Grove, Ont.
143	Lady Tillie Acema.....	9229	8,290·	308·65	3·72	361	R. O. Morrow....	Hilton, Ont.
145	Daisy Quirk...	11190	10,009·09	395·26	3·95	348	Thos. Hartley ..	Downsview, Ont.
146	Tensen Posch DeKol.....	9567	12,006·39	365·92	3·04	365	"	" "
148	Queen DeKol Peer 2nd....	10203	10,339·1	365·75	3·54	358	Edgar Dennis.....	Newmarket, Ont.
152	Boutsje Posch Mercedes...	10356	8,927·95	262·33	2·938	288	S. Lemon	Lynden, Ont.
153	Summer Hill Countess.....	9287	13,250·5	422·23	3·33	342	C. R. Dyke.....	Armitage, Ont.
157	Lakeview Rattler.....	11364	14,401·3	504·87	3·50	365	E. F. Osler.....	Bronte, Ont.
160	Canaan Beauty.....	8457	9,431·	291·58	3·09	365	F. E. Came.....	St. Lambert, Que.
161	Lady Fairmont Posch.....	10679	9,525·17	281·30	2·95	308	F. I. Burrill.....	Holbrook, Ont.
164	Polly Woodland DeKol....	10390	9,433·15	302·64	3·20	365	S. M. Peacock....	Mt. Salem, Ont.
167	Aaggie DeKol of Woodland	10413	11,884·5	382·31	3·21	365	J. M. Van Patter..	Aylmer, Ont.
168	Korndyke DeKol Daisy ...	10317	9,685·75	349·52	3·61	302	R. Clarke.....	Henfryn, Ont.
170	Diana Woodland Sarcastic.	10389	9,595·45	375·23	3·91	358	G. E. Peacock....	Mt. Salem, Ont.
171	Korndyke Wayne DeKol..	9609	10,932·	408·70	3·73	349	J. W. McCormick.	Morewood, Ont.
177	Pauline DeKol Albino.....	9621	11,071·6	361·77	3·26	365	S. G. Carlyle.....	Chesterville, Ont.
178	Belle Dewdrop 6th	10133	11,391·	338·39	2·97	312	E. Laidlaw & Sons	Aylmer West, Ont.
182	Queen's Pride of DeKol ...	10955	9,718·25	295·82	3·04	365	R. Honey.....	Brickley, Ont.
187	Lucy DeKol Posch.....	8326	12,328·	408·18	3·31	365	J. M. VanPatter..	Aylmer, Ont.
192	Canaan Mosetta.....	8527	9,701·	336·93	3·47	365	F. E. Came.....	St. Lambert, Que.
193	National Queen DeKol	10134	14,735·5	506·16	3·43	316	E. Laidlaw & Sons	Aylmer West, Ont.
194	Lady Calamity Pauline....	11248	10,369·81	332·73	3·20	365	Cecil W. Hagar...	Welland, Ont.
195	Doris Lee Pietertje.....	9011	11,324·75	404·96	3·57	327	S. J. Foster.....	Bloomfield, Ont.
197	Aaggie Emily of Riverside.	10253	14,376·5	455·27	3·16	365	L. W. Hutchinson.	Aurora, Ont.
199	Buffalo Girl Butter Maid..	11651	13,114·4	443·34	3·38	328	Tig. Wood.....	Mitchell, Ont.
201	Bessie DeKol of Niagara...	9354	13,439·18	462·86	3·44	365	John C. Brown ...	Stamford, Ont.
204	Johanna Mercedes of Riverside.	10858	11,520·7	377·56	3·27	336	C. Duff Nelles	Boston, Ont.
205	Belle Mercedes Posch.....	12117	9,265·75	295·74	3·19	365	Elias Ruby	Hickson, Ont.
207	Lulu Keyes	10333	19,258·45	542·67	2·81	365	E. B. Mallory.....	Frankford, Ont.
210	Utica Teake DeKol	9009	10,440·5	363·71	3·48	365	A. J. Tamblyn....	Orono, Ont.
211	Princess Concordia... ...	11445	11,401·	375·96	3·29	365	"	"
214	Sady Teake DeKol Beryl..	12564	8,864·81	307·41	3·46	293	R. Clarke	Henfryn, Ont.
217	Boutsje Posch De Boer....	8634	10,700·9	391·93	3·6	349	S. Lemon.....	Lynden, Ont.
218	Agnes Evergreen.....	10339	9,423·6	324·67	3·4	344	"	"
223	Korndyke Pauline DeKol 2nd.	11573	8,975·	381·59	4·25	333	J. W. McCormick.	Morewood, Ont.
224	Korndyke DeKol Queen...	14124	7,548·75	290·35	3·84	307	" ..	"
225	Brooklands Korndyke Gem	11812	8,615·06	334·91	3·8	327	" ..	"
226	Summer Hill May.....	9288	10,242·5	311·90	3·04	319	John F. Smith ...	Armitage, Ont.
231	Princess Calamity Posch DeKol.	10505	11,021·5	347·12	3·14	336	Tig. Wood	Mitchell, Ont.
233	Gertie Posch Westwoud...	11862	10,869·82	343·064	3·15	363	Thos. Hartley....	Downsview, Ont.
234	Schulling Pride 2nd.....	12007	7,872·6	312·69	3·97	365	"	"

JERSEY—COWS FIVE YEARS OLD AND OVER.

R. of P.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Per cent of Fat.	Days in Milk.	Owner.	Addres
7	Fancy's Countess....	694	8,589·5	493·88	5·75	365	A. H. Menzies&Son	Pender Island, B.C
11	Aristocrat's Fanny.....	1188	11,097·5	539 48	4·86	365	B. H. Bull & Sons	Brampton, Ont.
13	Brampton Blue Fly.....	300	9,982·4	511·91	5·12	365	"	"

JERSEY—COWS FOUR YEARS OLD AND UNDER FIVE.

8	Lady Buttercup of Pender.	698	9,305·5	465·52	5·01	365	A. H. Menzies&Son	Pender Island, B.C
9	Golden Milkmaid.....	1,483	8,442·5	409·41	4·85	328	"	"

JERSEY—COWS THREE YEARS OLD AND UNDER FOUR.

6	Lady Rose of Pender.....	699	10,086·5	459·33	4·55	364	A. H. Menzies&Son	Pender Island, B.C

JERSEYS—COWS TWO YEARS OLD AND UNDER THREE.

1	Lilac of Pender.....	697	5,674·	314·15	5·53	352	A. H. Menzies....	Pender Island, B.C
2	Lady Buttercup of Pender.	698	8,016·	449·7	5·61	352	"	"
3	Lady Rose of Pender	699	8,014·	427·34	5 35	352	"	"
4	Lady Grey....	804	6,495·23	364·37	5·61	341	FrankGlydon&Son	Kensington, P.E.I
5	Brampton Lady George....	1,132	11,001·85	445·63	4·14	365	B. H. Bull & Son..	Brampton, Ont.
10	Lady Flora.....	729	7,549·87	343·94	4·55	266	Wm. Clark.	North Wiltshire, P.E.I.
12	Brampton Fereor Tister....	987	6,576·	326·28	4·9	364	B. H. Bull & Son..	Brampton, Ont....

APPENDIX No. 21.

REPORT OF THE CANADIAN NATIONAL LIVE STOCK ASSOCIATION.

LIST OF DELEGATES PRESENT.

Third General Convention held at Ottawa, February 12 and 13, 1912.

OFFICERS.

President—Robert Ness, Howick, Que.
Vice-President—Andrew Graham, Pomeroy, Man.
Secretary-Treasurer—A. P. Westervelt, Toronto, Ont.
Directors—John A. Turner, Calgary, Alta.
Napoléon Lachapelle, St. Paul l'Ermite, Que.
P. M. Bredt, Regina, Sask.
A. D. Paterson, Ladner, B.C.
M. Cumming, Truro, N.S.
W. W. Ballantyne, Stratford, Ont.

PROVINCIAL DEPARTMENTS OF AGRICULTURE.

Alberta—W. F. Stevens, Edmonton.
Saskatchewan—Robt. Sinton, Regina.
Manitoba—F. W. Brodrick, Winnipeg.
Ontario—G. E. Day, Guelph.
New Brunswick—W. W. Hubbard, Fredericton.
Nova Scotia—M. Cumming, Truro.
Prince Edward Island—Theodore Ross, Charlottetown.

PROVINCIAL COUNCIL OF AGRICULTURE OF QUEBEC.

W. H. Walker, M.L.A.

PROVINCIAL LIVE STOCK ASSOCIATIONS.

Vancouver Island Flockmasters':—C. H. Hadwen, Duncan; Alex. Davie, Ladner; A. C. Aitken, Duncan.
British Columbia Stock Breeders' Association:—A. D. Paterson, Ladner; S. Smith, Dewdney; George Sangster, Victoria.
Alberta Cattle Breeders' Association:—J. L. Walters, Lacombe; Wm. Sharp, Lacombe; E. L. Richardson, Calgary.
Alberta Horse Breeders' Association:—Geo. Lane, Calgary; J. C. Hargrave, Medicine Hat; E. L. Richardson.
Alberta Sheep Breeders' Association:—Bryce Wright, De Winton; E. L. Richardson.
Alberta Swine Breeders' Association:—Lew Hutchinson, Duhamel; Rice Sheppard, Strathcona; E. L. Richardson.
Cattle Breeders' Association of Manitoba:—James Yule, Selkirk; James Duthie, Hartney.
Horse Breeders' Association of Manitoba:—John R. Scharff, Hartney; A. C. McPhail, Brandon.
Sheep and Swine Breeders' Association of Manitoba:—A. Mackay, Macdonald; Andrew Graham.

Dominion Cattle Breeders' Association:—John Gardhouse, Highfield; W. W. Ballantyne, Stratford; A. P. Westervelt.

Ontario Horse Breeders' Association:—Wm. Smith, Columbus; Walter Milne, Green River; A. P. Westervelt.

General Stock Breeders' Association, Quebec:—Arsène Denis, St. Norbert; Thomas Drysdale, Allan's Corners; J. A. Couture.

Sheep Breeders' Association of Quebec:—James Bryson, Brysonville; G. Garceau, Three Rivers; J. A. Couture.

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Swine Breeders' Association of Quebec:—J. R. Monahan, St. Lin; J. A. Couture.

Maritime Stock Breeders' Association:—H. Montgomery Campbell, Apohaqui; W. W. Black, Amherst; C. A. Archibald, Truro; F. L. Fuller, Truro.

Ontario Sheep Breeders' Association:—Robt. McEwen, Byron; A. P. Westervelt.

Ontario Yorkshire Breeders' Association:—J. E. Brethour, Burford; Wm. Jones, Zenda; A. P. Westervelt.

Canadian Berkshire Breeders' Association:—John Kelly, Shakespeare; A. P. Westervelt.

Saskatchewan Horse Breeders' Associatioon:—W. H. Bryce, Arcola; P. M. Bredt.

Saskatchewan Cattle Breeders' Association:—Geo. Kinnon, Cottonwood; P. M. Bredt.

Saskatchewan Sheep Breeders' Association:—Robt. M. Douglas, Tantallon; A. B. Potter, Langbank; P. M. Bredt.

Saskatchewan Swine Breeders' Association:—M. J. Brennan, Francis; J. M. Stowe, Regina; P. M. Bredt.

Farmers' & Dairymen's Association of New Brunswick:—H. Montgomery Campbell; And. J. Jensen, Salmonhurst; Bliss M. Fawcett, Sackville.

Maritime Sheep Breeders' Association:—James A. Telfer, Markhamville.

CANADIAN RECORD ASSOCIATIONS.

Dominion Swine Breeders' Association:—R. J. Garbutt, Belleville, Ont.; Samuel Dolson, Norval Station, Ont.

Dominion Sheep Breeders' Association:—Jas. Snell, Clinton, Ont.; J. M. Gardhouse, Weston, Ont.

Dominion Shorthorn Breeders' Association:—T. E. Robson, London, Ont.; H. Smith, Hay, Ont.; W. G. Pettit, Freeman, Ont.; A. W. Smith, Maple Lodge, Ont.; Robt. Miller, Stouffville, Ont.

Canadian Ayrshire Breeders' Association:—W. F. Stephen, Huntingdon, Que.; R. R. Ness, Howick, Que.; W. W. Ballantyne, Stratford, Ont.

Canadian Hereford Breeders' Association:—R. J. Mackie, Oshawa, Ont.

Canadian Jersey Cattle Club:—R. Reid, Berlin, Ont.; L. J. C. Bull, Brampton, Ont.

North American Galloway Association:—Robert Shaw, Brantford, Ont.; D. McCrae, Guelph, Ont.

Canadian Guernsey Breeders' Association:—H. W. Corning, Cheggogin, N.S.; Daniel G. McKay, Heathbell, N.S.

Canadian Aberdeen Angus Association:—W. R. Bowman, Brandon, Man.; F. J. Collyer, Welwyn, Sask.

French Canadian Cattle Breeders' Association:—Louis Thouin, Repentigny, Que.; Victor Sylvestre, Clairvaux de Bagot; J. A. Couture.

Canadian Red Polled Association:—J. T. Maynard, Chilliwack, B.C.; W. J. McComb, Beresford, Man.

Clydesdale Horse Association of Canada:—Peter Christie, Manchester, Ont.; John Bright, Myrtle Station, Ont.; Robt. Graham, Bedford Park, Ont.; W. G. Graham, Claremont, Ont.; Fred. Richardson, Columbus, Ont.

Canadian Shire Horse Association:—John Gardhouse, Highfield, Ont.; James Henderson, Belton, Ont.

Canadian Hackney Horse Society:—W. C. Renfrew, Bedford Park, Ont.
French Canadian Horse Breeders' Association:—L. P. Sylvestre, St. Theodore d'Acton, Que.; F. Manseau, Nicolet, Que.
Canadian Percheron Horse Breeders' Association:—Geo. Lane, Calgary, Alta.
Canadian Thoroughbred Horse Society:—D. McCrae.
Canadian French Coach Horse Breeders' Association:—Baron Roels, Calgary, Alta.
Canadian Standard Bred Horse Society:—George Pepper, Toronto, Ont.
Holstein-Friesian Association of Canada:—G. W. Clemons, St. George, Ont.; T. A. Spratt, Billings Bridge, Ont.; W. W. English, Hamilton, Ont.; B. Mallory, Belleville, Ont.

VISITORS.

Name.	Address.
J. H. Clark,	Experimental Farm, Charlottetown, P.E.I.
J. A. Amear,	Lower Montague, P.E.I.
Wm. Houston,	Toronto, Ont.
F. C. Harrison,	Macdonald College, Que.
H. Barton,	Macdonald College, Que.
John Campbell,	Woodville, Ont.
R. S. Stevenson,	Ancaster, Ont.
J. D. Eadie,	Vars, Ont.
J. Herbert Smith,	Toronto, Ont.
R. E. Everest,	Experimental Farm, Scott, Sask.
Senator Douglas,	Tantallon, Sask.
S. F. Tolmie,	Victoria, B.C.
W. H. Fairfield,	Experimental Farm, Lethbridge, Alta.
G. H. Hutton,	Experimental Farm, Lacombe, Alta.
A. M. MacDonald,	Lacombe, Alta.
N. J. H. Wylie,	Toronto, Ont.
P. H. Moore,	Experimental Farm, Agassiz, B.C.
W. J. Stark,	Edmonton, Alta.
John P. Monahan,	St. Lin des Laurentides, Que.
R. Robertson,	Experimental Farm, Nappan, N.S.
F. A. Walsh,	V.S., Yarker, Ont.
Wm. A. Munro,	Experimental Farm, Rosthern, Sask.
J. S. Kyle,	North Winchester, Ont.
J. J. Ferguson,	Chicago, Ill.
R. J. Phin,	Moosomin, Sask.
H. C. McMullen,	Calgary, Alta.
E. Cora Hind,	Winnipeg, Man.
Hugh McKellar,	Moosejaw, Sask.
A. H. Hall,	D.V.S., Grimsby, Ont.
W. C. McKillican,	Experimental Farm, Brandon, Man.
J. H. Ashcroft,	Toronto, Ont.
C. C. L. Wilson,	Ingersoll, Ont.
F. F. White,	Toronto, Ont.
W. J. Langton,	Toronto, Ont.
J. Lloyd-Jones,	Burford, Ont.

GENERAL CONVENTION

OF THE

NATIONAL LIVE STOCK ASSOCIATION

The Third General Convention of the National Live Stock Association was held in St. Patrick's Hall, Ottawa, on February 12 and 13, 1912. Mr. Robert Ness, Howick, Quebec, president of the Association, occupied the chair at the opening meeting. The first business was the roll call and reading of the minutes of the last convention.

Moved by Col. H. Montgomery Campbell, and seconded by W. G. Pettit, that the minutes of the last meeting as printed be accepted as read. Motion carried.

PRESIDENT'S ADDRESS.

Gentlemen,—In calling this meeting to order, I need not say how much pleasure it gives me to welcome to this convention delegates from all parts of our great Dominion and to find that the various phases of our live stock industry are so capably represented by the gentlemen who are present here this morning. In setting before you in these few opening remarks, the subjects which are to occupy your attention throughout the several sessions, I am reminded of the important results which have followed previous conventions of this National Live Stock Association. You will remember that the nationalization of Canadian Live Stock Records was accomplished in consequence of the agreement that was reached at one of them. You will remember, also, that at another, after a very full discussion a decision was arrived at as regards the admission under uniform regulations of pure-bred live stock into Canada. The resolutions in which this decision was finally given definite form were later embodied in customs legislation subject to which, from that date until now, pure-bred live stock has entered this country.

In addition, however, to the friendly adjustment and settlement of difficult questions and to the favourable opportunities which were provided, of determining the best policy to be followed as regards matters of national significance in relation to our varied live stock interests, not the least important effect of these conventions has been the more cordial relationship and the better understanding which have been established amongst representative men from all parts of the country. We have during this convention some very important problems to discuss and some very difficult decisions to reach, but in the main your deliberations here can serve no more comprehensive purpose, can attain no more far-reaching result than that suggested in my last remark. I would ask you, therefore, to assist me in obtaining and preserving a national outlook in the discussions which are to take place and in securing a broad minded consideration of the subjects which appear on our programme. We must agree to subordinate individual and local interests to the interests of the country at large since in no other way can we justify the purpose for which this convention was called, and in no other way can we create that atmosphere out of which large results may grow.

We cannot but be impressed by the opportunities which are presented to us. It is opportune that we should confer together at a time when the falling off in live stock production reveals conditions which are very greatly to be deprecated. That the country is prosperous we have every reason to believe, but the increasing cost of living

is creating an economic situation which cannot continue, particularly in view of the fact that the cost to the consumer is out of all proportion to the price realized by the farmer and breeder. Despite the fact that the domestic consumption of agricultural products is extending in every direction, the production of meats in Canada is declining proportionately and, it would appear, absolutely. Our export trade has dwindled, except in the case of bacon, to an almost insignificant item and our western provinces are depending to a larger and larger degree upon imported meats to provide for their requirements. The situation is becoming acute, and I submit the whole question to you for your most careful consideration.

Among the subjects which appear on our programme, possibly no other one is of more vital importance in its relation to our live stock interests than that of bovine tuberculosis. You are very well aware of the losses which are met with annually and which are to be charged directly to the presence of tuberculosis in our cattle and swine. Regarding these losses in the light of the prospective increase in the live stock of the country and remembering that the disease, if left unchecked, may be expected to increase in a much greater ratio, we cannot but realize the practical and economic significance of the whole subject, not to mention its immediate bearing upon the preservation of the general public health. The best trained intellects of the continent have given of their time and thought in an honest and public spirited effort to reach an agreement as to the best policy to be adopted with a view to the control and, if possible, eradication of the disease in both the United States and Canada. You are acquainted with their recommendations which, while conservative, are yet definite and which make it very evident that any prolonged postponement of aggressive action would neither minimize the difficulties to be anticipated nor serve the best interests of the stock owners of the country. That the discussion of this question is to be delegated to the capable hands of our Live Stock Commissioner speaks well for a satisfactory adjustment of the troublesome problems involved.

In further relation to the work which we shall have in hand, it has occurred to me, gentlemen, that the object for which this convention has been called will not be fully met unless we prepare ourselves to present to the Minister in a reasonably definite way the views of the stock men of Canada, as regards the measures which he may be justified in undertaking with the view of encouraging and stimulating the development of the industry in which we are all engaged and in which our most important interests are involved. We are here by invitation of the Minister to represent the live stock men of the Dominion, and it appears to me that we should fail in our duty if we were to shirk our obligation in this regard. Realizing as we must all do, that it is a responsible office which we assume in deciding upon such action, it behooves us to approach the task in no narrow spirit and to balance well the recommendations we may finally resolve to make. In counselling deliberation, however, and mature judgment, I would urge that, when convinced of the wisdom of any policy, we should freely and unhesitatingly advise its adoption. I commend, therefore, to the Committees on Resolutions, yet to be appointed, the far-reaching importance of the work with which they may be charged, and would urge upon them the necessity of it being given their best consideration and most careful attention.

In concluding these opening remarks, gentlemen, let me say that I want you to assist me in making this convention successful. I realize the responsibility that attaches to the position with which you have honoured me and that not a little will depend upon the chairman in making definitely effective the discussions which are about to take place. I cannot do it alone, however. Your individual co-operation is essential, and I feel that I bespeak it in the request which I now make. The subjects which follow are to be your subjects. This convention is to be your convention. We must combine to ensure its being productive of really practical and permanent results. The opportunities which are here afforded us are of such national importance that at the outset our view point must be broad minded to comprehend them. The task that

confronts us is big enough to be worthy of our best effort. The presence of so many representative men from all parts of the Dominion has already charged the atmosphere with a spirit of optimism and of anticipation. In this spirit, gentlemen, I declare the convention open for business.

Col. CAMPBELL.—I move that the president's address be referred to a committee for consideration and reported back to this meeting.

(Motion seconded by Col. McEwen and carried.)

Mr. JOHN BRIGHT.—If it is in order, I desire to move, seconded by Dr. Tolmie, a resolution as follows: 'That R. Graham, Peter Christie, P. Bredt, N. Garneau, George Pepper, Professor Cumming, W. W. Hubbard, George Lane, M. McPhail, John Gardhouse and the mover and seconder be appointed a committee to consider all questions *re* the horse industry part of this convention, and to submit, not later than to-morrow afternoon, their recommendations as to the best means to be adopted for the improvement, betterment and more united conduct of the interests of this very great industry.' It is not necessary for me to take up much of your time on this question. We, as horsemen, consider that this question is a live one and that such a committee should be appointed to take into their earnest consideration these matters and to report on some means of getting together for the purpose of facilitating and bettering the horse industry. When it is considered that financially the horse industry of the Dominion is equal to the investment in all other kinds of live stock —I say, gentlemen, there is as much money tied up in the horse business in the Dominion as in all other live stock put together—when you take that into consideration, then we feel that some suggestions will come from this committee, which is composed of men in the business representing Canada from the Atlantic to the Pacific.

(Motion carried.)

ADDRESS.

Honourable Martin Burrell, Minister of Agriculture for Dominion of Canada.

It is hardly necessary for me to say that it affords me a great deal of pleasure to address a few brief remarks to gentlemen who represent such an enormous interest as that of the live stock of Canada, and who are here from all parts of this great country, from the Atlantic to the Pacific. It is not many years since live stock matters and other branches of agriculture were carried on with somewhat more of a provincial outlook than they are at present, and I think it is a happy state of things that we have at last come to the day and hour when we can look at all these things in the broadest light and regard our interests as absolutely national.

It is peculiarly significant and important that meetings of this kind should be gathered here at this particular time. I am not going to make any extraordinary announcements on the live stock industry. I will not even go as far as our friend, Mr. Bright, did and say that one thing is better than another, because I might get into trouble. As far as I understand it, there are conditions in the live stock industry that cause serious apprehension among our live stock friends and call for remedies which you will discuss here. If I understand it rightly, along some lines of your industry, notably that of beef cattle and export trade, there is a good deal of cause for anxiety. The Live Stock Commissioner, Dr. Rutherford, in his last report stated that the export trade, both in cattle and in meat, was not only diminishing to a very serious extent but that if the decrease went on, it was likely almost to disappear, and I heard several gentlemen at meetings I attended in Toronto and elsewhere lately, make a statement to the effect that the beef industry especially is not in the flourishing and progressive condition that it was even twenty-five years ago. I do not pretend to be able to offer any diagnosis of this situation or even to prescribe a remedy. All of us, who know the country from end to end can understand that in some parts of the country these conditions may be explained in a comparatively simple manner. We can thoroughly understand that in the west there are hundreds of thousands of people pouring in who are not able, as yet, to go into stock breeding and who are only, as it were, miners of the soil, confining their attention almost entirely to wheat, and the live stock industry has not kept pace with the extension of the wheat area.

In my own province of British Columbia, there are other explanations. In my own time, I have seen enormous cattle ranches become too valuable to be held for cattle purposes and they have been cut up into fruit ranches. One especially, right in my own riding, of about 40,000 acres, which was largely devoted to cattle, has now been cut up for fruit farming purposes. There is another in the northern part of my own riding where they have been running 15,000 head of cattle for a good many years, and they are now considering cutting that up for the same purpose. Therefore, you can understand why the cattle industry has diminished in British Columbia rather than increased. I do not know the situation in Ontario so well, except in so far as I have heard it discussed at your different meetings, nor do I know the conditions exactly in the eastern provinces, although I have had it put before me by some gentlemen recently from these provinces, who have pointed out a condition of things which calls for some encouragement, and I may say frankly here to any of these gentlemen who are present that we propose to give them that encouragement as far as possible. If this is true, it behooves us all now to try to look for remedies. It is, perhaps, not so easy to provide them as it may be to talk about them.

I do not need to say anything to you gentlemen who are so deeply concerned with the question of pure-bred live stock, except in a very earnest way to congratulate you upon the very valuable work which you have been doing for the live stock industry of Canada by promoting the introduction of pure-bred stock. Perhaps the ordinary

man does not realize the importance of it to the extent that you do yourselves. Probably I ought not to say the 'average' man, but rather to say the careless man who thinks it is economy to buy an animal because it is cheap rather than a better one which would cost him a little more. That is one of the most fatal mistakes that is ever made. These men do not seem to appreciate the tremendous danger they are running, in deteriorating the whole cattle industry of the neighbourhood by the use of sires which transmit qualities that are absolutely undesirable. I would like to say to the National Live Stock Association—speaking as Minister of Agriculture—that the government realizes that your efforts along these lines have resulted in valuable work of which Canada is rightly proud.

What I have said in regard to live stock is equally applicable to horses, and I thoroughly sympathize with our friends, Mr. Bright and Mr. Smith and Mr. Miller and others whom I have heard discuss this question, and who claim, perhaps rightly, that the question of horse-breeding deserves and should receive every consideration. We in Canada, have not given the same consideration that has been given to that industry by other countries like Germany, Austria-Hungary and France. There are reasons why State aid should be more in evidence in some of these countries than it is in Canada, one of which is that the breeding of horses for military purposes, for their great army equipment, is a vital part of the national work and is to some extent responsible for the greater amount of State aid that is given than in countries of such an extremely peaceful character as Canada. After all, however, we never know what may happen, and it is just as well to proceed vigorously along all lines.

This leads to the question of how far the government is supposed to go in its encouragement and help to any particular industry. It may be a debatable question as to whether the government should do anything to help any industry besides keeping law and order and allowing the industry to be extended by private initiative. If, however, we consider the principle of State aid at all, in any direction, then it is not debatable upon what lines that State aid should move, as all governments throughout the civilized world have recognized that the first and fundamental movement that should be made along the lines of State aid is that of an educational kind, and accordingly all countries have recognized that generous assistance to education is always the legitimate function of State control. If that is so, then I think we might extend the principle somewhat further in its application and admit that educational work along the lines of supporting a prominent industry of any country is also justified. I think every man in this room will cordially agree with me when I say that the basic industry of agriculture is eminently one in which aid of that kind can be justified on the part of any government, even if I confine that remark to the educational side. If liberal support were given along that line, I am not at all sure but that, if educational methods were applied to their legitimate and rational conclusion along lines of agricultural work, it would ultimately do away with a great many of the difficulties under which you are labouring. As you know, a good deal of the work that you are doing to assist agriculture is of a distinctly educational character. We spend enormous sums in this country on such things as public works, dredging, assistance to railways by subsidies and in various other ways. Surely then, if we can spend these sums in these directions, every one of us will agree that support of a great industry like live stock, embracing as it does so many valuable features, would be proper and reasonable if conducted along right lines. The horse industry and the cattle industry and the sheep industry certainly might have a great deal done for them. I am glad to know that the government has been doing something recently to help the sheep industry. The best proof of the necessity for reasonable help along these lines is that according as we have a poor year in agriculture in this country, or a good year, it either makes or mars the prosperity of the whole country.

You all know that the Department of Agriculture of the government has done in the past—and I trust in the future will continue to do something towards helping

agriculture. We have done a good deal along the lines of safe-guarding the interests that do exist. I think every man here will admit that much good has been done in the suppression of the various diseases, work which has been in charge of the capable Veterinary Director General of this country, Dr. Rutherford. A lot of valuable work has been done in safe-guarding your interests against danger from the outside and also towards the aggressive extermination of dangers from the inside. This work is largely educational and should be carried on in such a way as to help this great live stock industry.

There is that great problem which has been touched on by Dr. Rutherford, the question of tuberculosis which is continually cropping up, and no doubt in the near future, some action will be taken with regard to it. It is true that it is better to move slowly than to move in the wrong direction, and it is better to move wisely even if progress is a little slow, but some action will have to be taken before long and a lot of educational work will have to be done before any drastic methods can be adopted. These are questions which you will discuss.

I have no doubt that in the course of your convention, many important matters will come up for discussion. A convention of this kind cannot fail to do a great deal of good. I have attended a great many conventions during the last twenty-five or thirty years, and I never saw a convention of this kind in which there was not a large amount of resulting good. It must necessarily come from the interchange of experience and from the gathering together of men who are experts along particular lines.

As far as the government is concerned, I may assure you that you have a government that is in sympathy with the great industry which you represent here to-day. Although at conventions of this kind, the tendency is sometimes to ask the government to do almost more than you expect—there are apt to be some hot heads—there are always a number of reasonable, level-headed, broad-minded men who look at these things from a practical standpoint. I would urge, therefore, that any suggestions you may have to make, which will come before me or the government, you frame in such a way, having regard to the conditions of the country and the government and everything else, that we will at least be prepared to meet some of them. I could not, of course, say that we will meet all of them, although perhaps you may be so extremely reasonable that that will be possible.

It affords me a great deal of pleasure to be here this morning, and it will afford me still more pleasure to come as often as I can to your meetings, but I think you will thoroughly realize that it may be impossible for me to do more than pay a brief visit now and again.

I hope this afternoon to have the pleasure of asking leave to introduce a bill into the House of Commons for the aid and encouragement of agriculture. It is the first bill of the kind, I think, that has been introduced, and it redeems a promise made to the people of this country by the Prime Minister. Although it is true that we cannot intelligently frame any broad measure to aid agriculture, especially in the various provinces, and work it out on lines of co-operation until there has been a most exhaustive survey of all the conditions, so that we will know exactly whether we are moving on right lines or not, yet in the meanwhile it is the intention of the government to introduce a bill providing at least some substantial help to all the provinces in connection with agriculture. It would not be proper for me to outline exactly what lines that will take, but I will say it will take the line of assisting each province rather than the direct way of arranging for the expenditure ourselves. It will be done in the belief and hope that the people of the provinces, represented by their governments, will know best how wisely to administer that help to the most pressing needs of agriculture in their respective provinces. It will be the business for you gentlemen who represent so large and important a phase of agriculture, to bring your particular needs before the governments of your provinces.

I say again that I am particularly glad to be here and to recognize the fact that you are all here for one purpose, namely, to better the conditions of the live stock industry of Canada. I trust you will not lose sight of the broad, national feature of the work, and I am convinced that every one of you will consider matters in a wise and sane spirit and do, so far as every man can do, his part to better and improve the whole conditions of the industry.

ADDRESS.

J. G. Rutherford, C.M.G., Live Stock Commissioner.

I need scarcely say that I am very pleased to have the opportunity of again addressing a gathering of the live stock men of Canada. I always feel very much at home in assemblages of this kind, because I have spent my life among live stock and live stock men and know that the live stock men are the salt of the earth, and, by all odds, the cream of the farming community. I feel more at home in an assembly of this kind than anywhere else.

I have listened, as you all have, with a great deal of appreciative interest to the address of the president and to the address of the Honourable Minister of Agriculture. I do not think it is necessary for me to enlarge further on the importance of this gathering or to say much about the object for which it is called. The programme speaks for itself, and I have no doubt from the names which appear on that programme that we will have a most interesting and most profitable discussion.

This National Live Stock Association has held only a few meetings, but at every meeting which has heretofore been held something important has been done. Never in the whole history of the Dominion has there been so great a necessity for sane, sober, serious and intelligent consideration of the live stock conditions as exists at the present time. We are face to face with a most remarkable situation. One of the greatest agricultural countries in the whole world, a country which prides itself on its agriculture, is in the remarkable position of importing and of being an importer of food products, of live stock products, to an enormous extent. Before this meeting is over, you will hear from different quarters, some figures which are actually astounding in their magnitude as to the increasing proportion of the importations of live stock products to this great country. We who are familiar with live stock conditions and who are enthusiastic on behalf of the live stock industry, realize fully what live stock means to the agriculture of any country and we know what the live stock industry means to the agriculture of Canada. Unfortunately, however, we have a number of people who do not grasp the importance of the live stock industry from an agricultural point of view, and that is one justification of what I said when I began my address, that the live stock men were the 'salt of the earth.' I look upon every man who engages in the live stock industry as an intelligent man; every man who makes a success of the live stock industry, whether as a breeder of pure-bred stock or a producer of commercial live stock, I look upon him as an important factor in the community in which he lives. I only wish we could get a sufficient number of apostles to go through the country and preach this gospel of live stock and live stock production.

When you consider it there is a tremendous waste of animal food going on every year in Canada, and when I speak of animal food I do not want any confusion to exist in regard to the meaning of that term. An old gentleman who had become somewhat anaemic was told by his doctor to take more animal food, and a few days afterwards the doctor met him and he said: 'You are looking very, very bad. Did

you take my advice and eat more animal food?' 'Why, yes,' the old gentleman said, 'I did not do so bad on the bran and oats, but the hay did not agree with me at all.' Now, when I speak of the waste of animal food, I refer to the grass which grows up every spring and which is allowed to wither every fall, and which has not, in the meantime, been manufactured into marketable products. I refer to the millions of tons of straw which are destroyed every year in the northwest provinces and the tremendous waste which goes on every year in Canada in that regard through the short-sightedness of our people.

I was a statesman once, you know, and they entrusted to me 362 Doukhobors, who landed in this country in 1898 from the old country. These 362 Doukhobors came to Portage la Prairie and we housed them in the old court house. They used to start out in little parties of ten or a dozen in the morning—it was in the winter time—and they would hie themselves across the frozen prairies and walk all day and come back to the court house at night. I used to wonder what they were doing, but I could not speak the Ruthenian language and they were not familiar with Scotch and we could not communicate with each other. We had a number of gentlemen who would have liked to become office holders under the government and they came to me and asked that they should be appointed farm instructors for these poor ignorant Doukhobors who had left the steppes of Russia and had come to Portage la Prairie to commence farming on the prairies. I had a number of applications from men who were more or less successful in farming who wished to become instructors in agriculture to these people. I had an interview with the leader of the Doukhobor congregation through an interpreter, and he came back to me with a smile on his countenance and said, 'These people say that they do not want your instructors. They say that they have gone out and travelled all over this district. They have gone out every morning and have visited from twenty to thirty farms every day and they say they do not want to learn the kind of farming that is followed in Canada. They say there is more waste on one Canadian farm than would keep five Doukhobor families.' There is no doubt that is true, and it is particularly true in the new provinces in the west. People forget so easily.

Consider the history of the wheat production on this continent. It is within the memory of men still living when the centre of the wheat industry on this continent was in the Genesee valley, which is across in the State of New York. It gradually worked its way westward through Ohio, Indiana, Illinois, Iowa, northern Minnesota and Dakota, and to-day it is in the province of Saskatchewan.

If you take the various members of the Clan of Ananias, who are found spread all over the country between the Red River and the Rocky mountains, who will dilate on the tremendous possibilities and the productiveness of our prairie land, you will find them reiterating a statement that these are absolutely inexhaustible. They will say that they have grown wheat for sixty-five years in succession and that they are still growing it profitably. That is the story you hear, but we all know the history of the other wheat districts where year by year the yield decreased and decreased. In our Canadian northwest, the same thing will happen as happened to the people in the State of New York and in Ohio and Indiana and Minnesota and Dakota, and we will run out of the wheat-growing soil and it will become exhausted of its wheat-growing capabilities and then where will we have to turn? We will have to turn to the live stock, and the important thing is to get that live stock in there now to retain the fertility of the soil and not allow it to become exhausted. We must develop the live stock industry in order to husband our resources, and we must give up this land-robbing which lands every man who persists in following it in the poor house.

Are we as a nation doing what we ought to do in this regard? I say, no. I have seen, and you western men have seen, and you can see to-day that if you go out on a farm and stay for supper you get your tea without any milk because there is no cow; you get canned vegetables and there are no fresh eggs because there are no hens, and

baker's bread is taken out from the town in a sack, and the butcher's wagon drives up to the house on the prairie two or three times a week. Why, I have seen farmers hauling home, in the month of May, four or five bales of hay in a wagon in order to enable them to feed their horses until they get their crop in! Is not that ridiculous, but that is exactly what we, as a nation are doing to-day in the matter of the proper developing and husbanding of our national resources? It is ridiculous and absurd that for years back we should have been importing mutton from Australia. Until last year it came in only from the west, but last year it came in from the east and it was landed in St. John, New Brunswick, and in Montreal, and the people in Montreal and Toronto were eating Australian mutton. Go down here on Laurier avenue to the first grocery store and what do you find? You will find South American beef in tins, and you will find that same brand of beef all the way across the continent. You will find beef from the Argentine Republic and Uruguay in Regina and Moosejaw, right in the centre of what should be the greatest beef-producing country in the world. These are things that we ought to consider.

Before this convention is over, a great many of these questions will be threshed out, and we will have a tremendous amount of information of the most valuable kind and I trust that much of it will be crystallized into such resolutions as you will be able to lay before the Honourable Mr. Burrell and his colleagues in the hope of getting some intelligent assistance in the direction of forwarding the great industry which we are so anxious to advance.

One word of explanation before I sit down. I think I owe it to our president. You may have noticed right behind me a picture hanging on the wall. It is a picture of an Ayrshire cow. The president is not responsible for that picture being there nor is any member of his family. In a sense, I am responsible for the hanging of that solitary picture there. I know there is a feeling of resentment—I see Mr. Clemon's eye. I notice that a few of our short-horn friends are palpably very much annoyed at the prominence given that Ayrshire cow, and I see a few admirers of the Channel Island breeds wondering why that red and white thing was hung up there.

The picture was hung there because it represents one of the best dairy cows in the Dominion, and she comes from Prince Edward Island. This is the Ayrshire cow, 'Milkmain 7th,' owned by A. McRae and Son, of East Royalty, P.E.I., which when entered into the Record of Performance test was nearly three years old. During the test her total production was 11,673·5 pounds of milk with 492·757 pounds of butter fat, the required production for cows of her class being only 6,446 pounds of milk with 232·4 pounds of butter fat. When I was presented with that picture last week, I said, 'We will hang it in the Convention Hall to show the members that something good can come from Prince Edward Island.' I said to myself, 'We will hang it there for another reason; because that cow is an indication of what intelligent, systematic, persistent and conscientious effort can do in the development of the dairy industry of our country, we will hang it there also because it will serve as an incentive to the men who are interested in the beef breeds, because it will be there as a constant note of warning to them that unless they wake up, this cow and the like of her will put them out of business.' Thus the picture is there for a number of reasons: to promote strife, to induce jealousy and to act as a bone of contention for this whole convention.

Being Scotch, I made up my mind that I would have a reason ready to protect myself from any possible attack that might be made upon me for having singled out this particular breed as being representative of the lower animal kingdom, and the reason she is there and that there are no others is because none of the rest of you brought them along.

I wish you every success in this convention. I know it will do good. I feel it is one of the most important gatherings which will take place in Canada during the present year, and I only trust that the lines indicated by the Honourable Mr. Burrell

will be followed and that the work of the convention will finally be put in such shape as to enable him and his colleagues to do something beneficial to the live stock industry in which we are so much interested.

PRESENT CONDITIONS OF THE LIVE STOCK INDUSTRY IN THE MARITIME PROVINCES.

Professor M. Cumming, Principal Agricultural College, Truro, N.S.

Casting my eye over the programme, I notice that you are to listen to a series of addresses upon the live stock industry of the various sections of the Dominion, and I presume that we are supposed to be more or less sectional in our remarks. So far, the addresses of this convention have been of a general character, and whatever I have to say will be with reference to the live stock industry in the Maritime Provinces. In the addresses of the Honourable Minister of Agriculture and the Live Stock Commissioner, we have listened for the most part to remarks with regard to live stock as related to the newer sections of the country, but I am going to speak from the standpoint of the oldest settled parts of the Dominion, where we have long ere this exhausted the soil through just as foolish methods as are now prevailing in the west, and where we now look to the live stock industry as the only means of maintaining the fertility of our soil.

There is no question about it, that if any part of Canada is calling for a development of the live stock business, it is that part with regard to which I am speaking at the present time. I can take you to farm after farm where, as a result of the policy of raising food products and keeping very little live stock, the fertility of the land is reduced to such a state that the people in some cases are actually forsaking their farms. In years when we suffered from drought, it was a universal comment that on those farms where live stock were kept, the crops were almost up to the average, and in some cases even above the average. Without exception, on those farms where live stock had not been kept and where the fertility had been reduced and the amount of humus in the land diminished, the crops were almost a complete failure. I can point out farm after farm in the Maritime Provinces, where, as a result of keeping live stock for the last five or eight years, the output has been increased from a smaller acreage as compared with adjoining farms where live stock was neglected. I can point out cases where young men who have spent their early days in the United States have come back to take up the old homestead farm, and by keeping live stock, are doing much better than they could on the other side of the line.

I can recall one instance where a young farmer returned from the United States and, having learned a few lessons, he increased the number of the live stock, improved their quality and trebled the output of the farm. From these instances, we are more and more impressed with the fact that in live stock alone lies the salvation of our maritime agriculture.

The outstanding feature of our development during the last six years has been improvement in dairy cattle and heavy horses. I shall first speak of these and then pass on to beef cattle, sheep and swine. The development with regard to dairy farming has been phenomenal, and we are willing to take second place to none in the case of some of our herds. Our reputation is being recognized, and we have sent stock bulls to the western states and the northwest, and a very considerable number of pure-bred stock have been sent as far west as British Columbia. All this goes to show that our breeders have come to realize as they never did before, that it pays to have the best. My experience has been, that the cheapest stock I have bought has, in the end, been the most expensive, and now instead of buying any cheap stock, I confine my attention entirely to the highest priced stock.

I am glad that the representative of Prince Edward Island saw fit to present the Live Stock Commissioner with this picture of a dairy cow. She represents the value of keeping a record of production. Prince Edward Island, at the present time, holds the world's record for a two-year-old Ayrshire, but I am sorry to say she is likely to be beaten shortly. The record of this cow is 11,673 pounds of 4 per cent milk, and we are told that our average production per cow is only 3,000 pounds.

I want to say a few words with regard to the development of the horse business. The demand for heavy horses has been tremendous during the past few years. In the year 1900 there were not, in the province of Nova Scotia, more than two or three registered, heavy draft stallions; to-day there are approximately seventy-five or one hundred, and I think the same condition prevails in other Maritime Provinces. This is all due to the effect of educational work carried on by the different governments, and also due to the fact that there are an increasing number of private individuals who know that pure-bred sires are absolutely essential to the improvement of our horses and who are trying to do something along that line, and fortunately with a great deal of success. I am glad to know that that question is going to be dealt with and that the government is going to encourage the men who, under somewhat unfavourable conditions, are investing large sums of money in pure-bred horses. We have bought some of the best in Canada—those that were prize winners at Toronto and elsewhere, and we have brought them to our province. The unfortunate feature, however, is that, under present circumstances, these horses are usually succeeded by grade stallions. This is a detriment to men who are investing their money in pure-bred stock, and I believe the situation is more serious with us than it is with you.

The Nova Scotia Farmers' Association unanimously passed a resolution that legislation should be enacted with regard to this subject. Never was a resolution passed more unanimously, and I have already conferred with the Premier of our province and he has agreed to present to the people a bill very similar to that which has been strongly urged by the Veterinary Director General. There is no doubt it will be a forward step.

The high-class horses that have been brought to the province have paid for themselves over and over again. We want to make it possible for private individuals to put money into high-class horses and to be in such a position that they will not have competition from these cheap horses, but will be able to reimburse themselves for the money they have invested. We must suppress the scrub or else we are going to stand where we are. I am glad to tell you that we have now established a Maritime Horse Show under the Maritime Stock Breeders' Association.

Now, I come to another matter which has already been referred to, and that is the beef cattle situation. Beef cattle have barely held their own in the Maritime Province during the last five or six years. The dairy cow, because she is a producer of wealth has been gradually making headway over her beef contemporary, and as a result, the situation has become somewhat serious and we are importing into the province more beef every year. When we talk to the farmers about it, they simply tell us that the pure beef animal will not pay for herself at present prices. If there were any way of promising the farmers that they would invariably get seven or eight cents a pound live weight for their cattle, it would be all right, but they say the price frequently goes down to five or six cents. The great thing that is needed is improvement in the milking qualities of our beef cattle and the cows must be of such a character that they will at least pay their board. A cow that does not give any more milk than sufficient to raise her calf will not pay for herself in our province. As that is the only way in which we can solve the question, we must pay more attention to the milking qualities of our beef cattle.

Now I come to the sheep industry and we will take second place to none in regard to the character of our country for raising sheep, yet the fact remains that the sheep business has not made progress during the past year. If anything, it has barely held

its own; in fact I am inclined to think it has slightly retrograded. There are many reasons to give for this, but I believe the fundamental reason is that while sheep require less attention than any other class of stock kept on the farm, yet the quality of the attention they receive must be of the very best.

Our people are inclined to think that if you have a flock of sheep you can simply let them range over the bare and poorly cultivated hills and they will look after themselves, but we have learned by sad experience that that will not do. Our people must be taught that, in order to keep sheep successfully, they must grow some succulent crop and must look after their pastures better than they have in the past. If, as a result of this report that has been brought in by the Sheep Commission of the Dominion Department of Agriculture, anything is contemplated in the way of giving demonstrations in sheep farming, I am convinced that a great deal of good will be the outcome and that the sheep business will again take hold in our country.

As to hogs, we have made progress corresponding with the improvement in dairy cattle, and one would naturally expect this.

In conclusion, I realize that you in Ontario have your attention largely fixed upon those countries farther west which are, at the present time, the centre of the greatest activity, but you do not realize what is being done in these provinces by the sea. Nevertheless, I wish to assure you that we are making no uncertain progress. We are teaching the young men how to judge live stock by holding short courses, and they are going back to their farms with the intention of keeping more and better live stock. I am convinced that after a few more years have passed, this movement, which is already well under way, will have good results. We have a country which is as good as you have in Ontario or any province farther west, and there is no doubt the Maritime Provinces will be an important factor in the live stock industry of Canada.

THE LIVE STOCK INDUSTRY ON PRINCE EDWARD ISLAND.

By Theodore Ross, Secretary for Agriculture for Prince Edward Island.

Four years ago I had the privilege of addressing you on the live stock situation on Prince Edward Island. I pointed out at that time that, although the conditions were not good, the foundations were being laid that would result in rapid improvement.

HORSES.

The number of horses in Prince Edward Island at this time is about 32,660, an increase of seven per cent over 1908.

Within the last three years upwards of one hundred Clydesdale mares have been imported direct from Scotland. Most of them have proved quite satisfactory. A number of excellent stallions, too, of the several breeds, among them, 'Labori Again' and 'Baron Kelvin,' are now in the province giving a good account of themselves.

On the whole, horse breeding is making satisfactory progress. There are more really good stallions in the province now than ever before and good judgment is being more generally shown in the mating.

CATTLE.

Marked progress has been made in the breeding of dairy cattle. At our last meeting I stated that there were scattered here and there over the province young men building up excellent herds of dairy cattle of the several breeds. Their influence has been more or less contagious and to-day the province is proud of its dairy cattle.

Last year there were in the province 13 Cow Testing Associations, having in all 156 members testing a total of 1,169 cows.

There have also been entered in the Record of Performance Test 26 pure-bred cattle, one of which broke the world's record for a two-year-old Ayrshire, giving in 365 days 11,673 pounds of milk. Three other cows were being tested in the same herd at the same time, all of which have since qualified, one with 572·77 pounds of butter-fat to her credit. Seven-day tests have also been conducted for the Advanced Registry. In one herd three cows qualified with about 63 pounds milk and 2 pounds of butter-fat each per day to their credit.

But these are not to be regarded only as isolated instances of progress, they are indicative of the improvement that is taking place in dairy cattle generally.

In 1906 the total number of milch cows in Prince Edward Island was 45,550 and 32,083,640 pounds of milk were sent to the factory. In 1910, the latest year for which figures are available, while the number of milch cows was 50,115, or an increase of 10 per cent, the amount of milk received at the factories was 49,738,910, an increase of over 50 per cent.

This increase is not due to more factories being operated or to a larger number of patrons furnishing milk, but to better milch cows being better cared for. Moreover we are only at the beginning of the improvement. The next ten years will witness steady continuous development.

I regret to say that similar improvement has not been made in our beef cattle or sheep industries. They are just about where they were in 1908. The government made several importations of pure-bred rams and distributed them through the province, but so much injury has been done by dogs that people are continuing to go out of the business. The number of beef cattle in the province in 1910 was 49,975, of sheep 75,043.

SWINE.

We are continuing to make progress in hog-raising. The high prices of farm crops are, however, leading some of our farmers to market their hogs in an unfinished condition, to the detriment of the trade. A very large proportion of the prizes offered at the Amherst Fair for hogs, and particularly for bacon hogs, comes to our province. There are from 40,000 to 50,000 hogs raised annually.

POULTRY.

There has been a steady decline of late years, in the number of turkeys and geese raised, but the number of hens has increased very rapidly. Fattened chicken is now regularly offered for sale and a large export trade is being built up.

In 1907, the total value of the eggs produced was about $250,000; last year it amounted to upwards of $500,000, of which about 2,500,000 dozen were exported.

In conclusion, I would like to say that the live stock industry in Prince Edward Island is in a flourishing condition. The Department of Agriculture has for the last few years been paying particular attention to dairy cattle and to poultry. For the next few years more of its energy will be spent on its sheep and hog-raising. Our people are naturally good horsemen. It will be very difficult to improve the beef cattle situation in the province, which is almost wholly covered by co-operative cheese factories and creameries.

A general feeling of hopefulness prevails and the next ten years will witness a remarkable development of the live stock industry in Prince Edward Island.

PRESENT CONDITIONS OF THE LIVE STOCK INDUSTRY IN ONTARIO.

J. H. Grisdale, B. Agr., Director Experimental Farms, Ottawa.

I feel rather diffident this morning in appearing before members of the National Live Stock Convention to give a resumé of the present conditions of the live stock industry in Ontario. I feel diffident for the reason that I notice in the audience a

very large representation of the best live stock men in this province, and I consider myself as hardly the right man to take up this question. I had nothing to do with the selection of the individual. I was ordered by telephone to do this, and if you have ever had the experience of being in the government service, you will know that you receive your orders and do the best you can. Therefore, if my remarks this morning are not to the liking of any of you, you will know that I have tried to outline what I thought was the actual state of affairs in this province. I shall try to give you as clear an idea of the conditions as possible. It is no little task for a man to size up the live stock situation in a province such as we have in Ontario, a country that has for many years stood amongst the best in the world in the live stock industry. As breeders in this province, we have been able to hold our own wherever we have sent our stock; we have been able in fact to stand at the top of the list and, for this reason, I say this province stands second to none in the live stock industry in the whole live stock world.

We hold the happy position of being a sort of hunting ground for the live stock men all over Canada and the United States. When a breeder wants a good animal, he sends his agent, if he cannot come himself, to the herds and flocks of this province of Ontario and, if one may judge by what he sees on the farms of this province and other provinces, he goes away satisfied. This sometimes proves a drain on our herds, but still it is something to be able to ship our stock to all parts of the world and to continue in the work. Not only are we a source of supply for all parts of the Dominion for live stock for breeding purposes, but I am sorry so say we find ourselves called upon to serve as a source of supply of cattle for meat as well for nearly every other province. This, of course, should not be. It is to our advantage to a certain extent, but we could have other markets just as remunerative and just as profitable if such were not the case.

We also hold the proud position of being a source of supply for men capable of carrying on live stock lines of work in other provinces. Go where you will in America, but especially in our own western provinces, and you will find that the best stock men, or many of the best stock men, received their early training in Ontario. Then, again, we have the advantage of being the centre of the different associations. I need not enumerate these; you are as familiar with them as I am. Live Stock Associations for many years were established in this province previous to their being nationalized as at present. We, therefore, have a long list of advantages which have given us the status that we now hold amongst the provinces of the Dominion and in the live stock industries of the world.

But the reasons for this prominence are not merely the ones to which I have referred. We have something further: The people of Ontario, coming as they did from the United Empire Loyalists and the early settlers of this country, selected from the best classes of England and Scotland and Ireland, brought with them the feelings, sentiments, inclinations and ambitions of the good old Anglo-Saxons and have transplanted these ambitions and feelings into this province, so that, although we have added to our population men of other derivation, we still have sufficient men with strong inclinations in this direction to imbue the whole people. Practically every farmer in Ontario finds himself by his genius, inclination or family connection interested in live stock, and men who have by some means or other acquired riches, often turn some of their wealth into live stock and start breeding operations. Further, I have travelled in Europe and I have travelled from one end of this Dominion to the other, and no where have I seen conditions which, on the average, year by year, can be compared with conditions as they exist in the province of Ontario, for all classes of live stock. We have a province remarkably free from disease; we have a climate which not only lends vigour and stamina and energy to our live stock and to our men, but it lends health as well, and owing to the rigour of its winters, many of the disease germs which might otherwise develop are destroyed. We, of course, have that dreaded

disease, tuberculosis; let us hope that steps will be taken to stamp it out in the near future.

Another point which has helped us in this province is the American tariff, put into force some few years ago, which compelled a great many of our farmers to turn their attention to live stock, and on many farms where in past years they grew grain for the American market, they are now breeding live stock. Thousands of our farmers who previously thought of nothing but barley, turned their attention to live-stock feeding and, therefore, we are indebted to our American friends in no small measure for the success we have achieved in live stock lines. We are also indebted to them for a market, because, although they passed this regulation practically excluding our grain, they continued to admit our pure-bred stock duty free, and here was a line of operation where we had the best market in the world open to us. I am sorry to say it has been put under restriction recently, but, in my opinion, we owe our tremendous expansion along live stock lines in no small measure to the American market.

We are all more or less tainted with a little Scotch blood, and we all are interested in making a good penny, and I am safe in saying that there is no industry or no branch of farming which, if carefully and judiciously carried on, will give better returns for expenditure in the way of labour and money and energy than will live stock. Our government has done a great deal to help us along. We have our Live Stock Associations and Agricultural College, and men such as Professor Day and Professor Wade doing the best they can to improve and build up our herds and flocks and to improve our ideals in breeding. We have our Fat Stock Shows, eastern and western, and we are certainly making tremendous progress. Who cannot remember the little show we had here in Ottawa seven or eight years ago where we had but a handful of stock in many cases of poor quality, and then look at the Fat Stock Show we had in January last where we came nearly outdoing our western rival. Then we have the short course at Guelph and we are establishing short courses all over the province. These are going to have a wonderful effect upon the industry in this country. In addition we have the Farmers' Institutes where more or less work is done, and our Dairymen's Associations. The cheap transportatioon privileges we enjoy, which have helped advance our live stock interests quite materially, have been the result of work of the Ontario associations very largely, but, of course, in co-operation with the western provinces.

Now let me say something about the various classes of live stock found in this province. You will, perhaps, be interested in knowing the extent of improvement that has been made in the last ten or twelve years. Immediately after I was requested by the Live Stock Commissioner to do something on this line, I had a man go through the reports of the Live Stock markets in our principal agricultural papers and average up the prices month by month and year by year from 1900 to date. I took the Toronto markets as the markets which were most representative of the province. I began with horses, taking draft horses, general purpose horses and carriage horses and drivers. Let me give you a few of these figures. I will not undertake to give you all the details, but I can give you some interesting facts in connection with the trade as it is to-day and as it was twelve years ago.

In 1900, draft horses on the Toronto market averaged $150 apiece, general purpose horses sold for $125, carriage horses and drivers $160. In making these averages, I did not include the worst horses but just average priced animals. The price for these different classes of horses has risen gradually. In 1904, it was $200 for draft horses, $160 for general purpose and $240 for carriage. In 1908, $200 for draft horses, $170 for general purpose and $250 for carriage and drivers; in 1910, $235 for draft horses, $210 for general purpose and $350 for carriage and drivers; and last year, the price was $325 for draft horses, $250 for general purpose and from $350 to $400 for good drivers.

The horse population has gradually increased. In 1900, we had 617,300 horses; in 1910, 724,384, an increase of 98,000. We have had more horses in the country than we have to-day. In 1905, we had 672,000. The estimated value of these horses as given by the enumerators was $76 in 1900, $110 in 1905 and $136 in 1910. The increase in that time has been 108,000, or 17½ per cent. The population of Ontario increased 15·8 per cent during this period, so you see the horse has kept a little bit ahead of the human. Prices have been remarkable, instead of merely keeping pace with the times, the increase has been 80 per cent in the last twelve years.

Coming to beef cattle, I am sorry to say we have not been able to make quite such a good showing. In 1900, we had 1,500,000 beef cattle in Ontario, in 1910 we still had a million and a half beef cattle. There is a slight difference of about 50,000 more beef cattle to-day than there were in 1900. We are, therefore, not making much progress in this line. In 1900, the average price for the year, including all classes, that is exporters, butchers, stockers and feeders was 4·16. The average price in 1911 was 5·36. Prices did, however, reach a higher level than this for a time. By 1906, our beef cattle population had gone up to 1,834,571 but the price was very low, only 4·07. The highest price we have ever obtained for a year through, was in 1910, when it was 5·64, and exporters that year stood the highest of any record I can find, namely, 6·48 the year through. Butcher's cattle also stood very high that year, 6·32.

I have the figures of our export trade with Great Britain during the last six or seven years, and I will read them to you as an item of interest. Beginning with 1905, we shipped 148,718 from Canada. I could not get the figures from Ontario exclusively. In 1906, 160,789; 1907, 125,753; 1908, 121,076; 1909, 113,000; 1910, 78,000; 1911, 42,000. We have gone down very rapidly.

When it comes to dairy cattle, we have very few figures given except the population. In 1900, we had about 1,976,000; in 1910, we had 1,052,000. The price has very gradually improved. In 1900, about $45 a head was received for the best dairy cow; in 1910, it went up to almost $80; in 1911, it took a drop to about $65. The outlook for the dairy industry appears to be very much better than ever before. The high-water mark in the dairy industry, as far as population of dairy cows is concerned, was in 1903, when we had 1,153,000 odd dairy cows which, according to the statistics for Ontario were worth $36 a cow; and in 1910, the same statistician says they were worth $41.

Sheep make a most unsatisfactory showing. In 1896, we had 1,849,000 sheep in Ontario and last year it is just a little over the one million mark. One point to which I would like to draw your attention in connection with the prices is this, that whereas the price for old sheep has not materially increased or improved, the price for lambs has steadily gone up. While there used to be about 50 cents difference between ewes and lambs, there is now a difference of nearly $2 a hundred, showing that the people are becoming more careful of what they eat and are demanding lamb rather than old sheep.

In swine we have not made the retrograde movement that many people think. I was astonished in looking into it to find that the swine products exportation for 1910 was over $23,000,000 from Ontario. We have sold far more pigs in previous years, in fact the smallest number of pigs sold was in 1910, but we got such remarkably high prices that we made more money by a good deal. The price in 1910 averaged 8·74; 1911, 6·82; in 1909, 7·51. In 1904, we sold our pork for 4·99. The greatest sales were made in 1905, when we sold 2,269,000 pigs. We have to-day a million and a half pigs in the province of Ontario. At one time we had a good deal over 2,000,000.

I will not say anything about poultry, because I do not think this convention is interested in that line.

I was not able to get very many figures in connection with the pure-bred side of our business, and I have to depend more on what I have observed year by year. I

must say that I think, judging from the National Live Stock records and so on, that the different breeds are thriving and progressing. To give you a few figures, in 1908 the money received for registration purposes was $27,000, and it went up gradually until in 1911, it was a little over $50,000, showing an increase of about 33 per cent or 34 per cent. We registered in 1908, about 22,000 animals of the different breeds, and in 1911, we registered about 32,300, showing a decided improvement. I was unable to obtain any figures as to the prices but, judging from the reports one sees in the papers, they are holding their own. I think on the average, we may say that we can congratulate ourselves upon having held our own in our pure-bred live stock classes. We have made more than normal progress in pure-bred live stock population, and we have made much more than normal progress so far as number of breeders indicates progress, especially is this activity noticeable in several of the dairy breeds. This species of progress is, in my opinion, the best possible kind of progress to make and augurs well for the future.

Many of our sheep breeders continue to register in the American records and, therefore, our records are not exactly what they ought to be in that respect, still the numbers have not been quite as large in the last two years as they were in the earlier years.

In swine we have about held our own. The number of breeders of pure-bred swine has not materially increased and the number of registrations has not increased, but we have improved in quality.

When it comes to horses, which I have purposely left to the last, I do not feel that I am able to size the situation up in this respect quite as enthusiastically as our friend, Mr. Bright. He said that the horse industry meant more money than all the other live stock industries put together. There is, however, a tremendous amount of money and energy put into the horse business in Ontario and prospects are exceedingly good. Prices have more than doubled in ten years, and in view of the tremendous expansion of the western provinces are likely to continue to rise. When a man in the west wants a horse, he is practically compelled to come to the Ontario breeder who does not hesitate to ask $500 for a good colt, and who will not sell his mares at all. A business that is in that happy position surely looks promising.

I hope you will find something of value in these few remarks that I have been able to make. I appreciate the fact that I am not the most suitable man to make them but I have done the best I could.

PRESENT CONDITION OF THE LIVE STOCK INDUSTRY IN SASKATCHEWAN.

P. M. Bredt, Live Stock Commissioner for Saskatchewan.

When I was asked about a fortnight ago by your Executive Committee to address you to-day as to the present conditions of the live stock industry of Saskatchewan, I was very reluctant in accepting this invitation, because I was very doubtful if any man could do justice in twenty minutes to this great subject. I, myself, felt that I was the last man fit to do so, because, while I have certainly during the last eighteen years—that means since my arrival in this country—always taken a great interest in the live stock affairs of the Dominion, and of Saskatchewan in particular, I feel there are more capable men in Saskatchewan and right here at this meeting than I am to address you. Especially is this the case when you consider the fact, that when I came to Canada, I not only had to first acquire knowledge of the live stock conditions of Saskatchewan, but also had to learn your language; I don't think I need to tell you that I am not a born Britisher, but I am what some of you would rather term a 'foreigner.' This, however, is a mistake, because I think that after taking—15 years ago—the oath of allegiance, I have become, not only by form

but also by heart a true, faithful Canadian and British subject. So far as my ability to express myself in your language is concerned, I am hampered by the fact that I was too old when I started to learn English, and while I think that probably under other conditions, I could do full justice to the subject, the fact remains, that while the spirit is willing the flesh is weak—that means, in this case, my tongue and my lips. However, you will have to excuse this as it was your executive that asked me to address you to-day. There is another reason why I feel to-day not as capable as usual. I have had, during the last forty-eight hours, a very serious attack of nervousness, and while many of you know me and know that I am subject to nervousness, I am nervous to-day, and very nervous. You will, therefore, excuse me if, in some cases, I not only make use of my notes, but if I have to read part of my address. I never have done so. I have addressed meetings during the last thirty-five years of my life but I have never yet read an address, but I will have to do it this time.

Another thing you must excuse, I notice that Professor Cumming was asking the Live Stock Commissioner if he expected these remarks would be particularly sectional. I admit that my remarks will be sectional, and where they are not sectional take them to be sectional because I have to make some remarks that will be applicable to the whole west and are national.

Probably some of you will ask me if I have anything to say on live stock conditions in Saskatchewan, because while you may have heard about sunny Alberta as a great live stock country, you may have heard only about Saskatchewan as a great wheat producing province, in fact, as the greatest wheat producing province of the North American continent. It is true that Saskatchewan is producing more wheat than the rest of the Dominion of Canada put together, and it is also true that Saskatchewan is the greatest wheat producing province on the North American continent. I wish that, just for that very reason, it was also a very great live stock country. I say, I wish I could state that, since Saskatchewan is such a great wheat producing province, it was also a great live stock producing country. We all know that our soil never can go on forever producing such great crops if there is nothing done to restore or keep up its fertility, and live stock is the only means to do this. Now, I am sorry I cannot make such a statement, but I am glad that I am able to tell you that live stock conditions in Saskatchewan are not as bad as many of you may think, and I am especially glad to say that the government of Saskatchewan is using many means to stimulate an interest in the live stock industry of our province.

You all know that Saskatchewan was created a province in the fall of 1905, and the government, realizing the importance of a strong live stock industry, has tried ever since to encourage such an industry. The first thing they did was to create in the fall of 1905, a strong Provincial Live Stock Association, with the intention that this association should take hold of the live stock affairs of the province. This one association was soon divided into four Breeders' Associations—Horses, Cattle, Sheep and Swine—and certainly the work they have done is very gratifying. They first started out to hold an annual winter fair, at which fair not only the best live stock of the province and all neighbouring provinces were shown, but at which an important feature was the practical demonstrations by experts on the live animals and later upon the carcasses. Another important feature was in the judging rings, where the judges were asked—after having made the awards—to give reasons for their placing of the animals. For the young men, judging competitions were arranged, and in the evening lectures pertaining to live stock were given by the best obtainable practical live stock men and also by the highest learned authorities.

The winter fair was and is not the only work the associations did and at present are doing. The Sheep Association has started to hold annual sheep sales. The Cattle Breeders' Association is holding annual bull sales and the Horse Breeders' Association is encouraging the holding of regular annual stallion shows throughout the province.

Regarding the bull sales, the cattle breeders have, up to the present, been holding only one bull sale annually at Regina, but upon my suggestion they have decided to hold from now on at least four different bull sales throughout the province. My idea was, that in such a large province as Saskatchewan, the holding of only one bull sale was not enough to stimulate the breeding of good cattle, because even with cheap transportation we could not ask all the farmers to come to one place. It was not so much the expense of travelling as it was consideration of the time lost in coming to one central sale which prompted my suggestion, that we should not ask the farmers to come to the bull sales, but that we should take the bull sales to the farmers. These bull sales have been started, not for the benefit of the producer, but for the buyer of bulls and for the improvement of the cattle in Saskatchewan. We have another object in view and it is this: we want to try to encourage in the districts we think the most suitable for beef breeding, the breeding of beef animals, and in districts that are more adapted for dairying, we want to encourage the breeding of dairy cattle, thereby creating good beef cattle districts and good dairy cattle districts.

Of course, the carrying out of this idea will involve a somewhat higher expenditure, but we are confident that both the Dominion and Provincial governments will give us their hearty support in such an undertaking, especially when I mention that we will not only have to stick to our principle of making the bull sales open to all the breeders of the Dominion, but we may even have to come east and ask eastern breeders to support us by sending bulls for these sales to Saskatchewan.

The Saskatchewan government found in 1905, that just a year before, the Territorial government had passed a Stallion Enrolment Act, and they immediately went to work and tried to enforce this Act. While this Stallion Enrolment Act has been in the past, chiefly an administrative measure, it still has done some good in informing the farmers what kind of stallions they were using—that means so far as pure breed or grade was concerned—and it has also encouraged the keeping of pure-bred stallions, because under this ordinance only men who travelled pure-bred stallions were able to take a lien on the foals for overdue service fees. It also has enabled the government to classify as to breeds all the stallions that are standing for public service in Saskatchewan, and it has also furnished the foundation for a new stallion ordinance, that is just now before our local legislature. This new stallion ordinance will be made optional with the municipalities of the province. If the municipal council passes a resolution to adopt it, then it will be compulsory for all the stallion keepers in that municipality to subject their stallions to an inspection. In that municipality then only those stallions will be permitted to stand for public service that have passed such inspection. Stallions affected with hereditary unsoundness or possessed of great defects of conformation will not be allowed to stand for public service.

The time is too short to go fully into this matter, but I wish to say that the Horse Breeders' Association of Saskatchewan will be, in a large measure, connected with this ordinance, since they are represented on the board and will encourage the municipalities and the owners of stallions to adopt the ordinance. Prize money in future should only be given to inspected stallions.

It may interest you to hear some figures regarding enrolment of stallions under the old ordinance. In 1905, eighty-seven pure-bred stallions and seventy-two grade stallions were enrolled, and the figures for the succeeding years follow.

ENROLMENT of Stallions under the Territorial Horse Breeders' Ordinance of 1903.

Pure-Bred Horses.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Totals.
Clydesdale	56	85	78	111	186	250	218	984
Percheron	10	25	37	33	63	75	73	316
Shire	4	10	4	9	15	11	16	69
Standard bred	6	9	14	15	27	23	14	108
Hackney	1	6	4	10	12	9	6	48
Thoroughbred	2	3	1	1	5	5	6	23
French Canadian	....	....	....	....	....	....	1	1
French Coach	4	....	3	1	2	....	....	10
German Coach	....	2	....	1	1	2	2	8
Yorkshire Coach	....	....	....	....	1	1	....	2
Suffolk Punch	4	2	2	3	6	3	3	23
Cleveland Bay	....	1	....	....	....	....	....	1
Belgian Draft	....	1	4	1	5	15	14	40
Jacks	....	....	....	....	1	....	....	1
Saddle Horse	....	....	....	....	....	1	2	3
Irish Hunter	....	....	....	....	....	....	1	1
Total	87	144	147	185	324	395	356	1,638
Grades	72	115	130	186	350	290	333	1,476
Total enrolment	159	259	277	371	674	685	689	3,114

Just recently the Saskatchewan government also appointed a Live Stock Commissioner, whose chief duties will be to have under his control all measures intended for the improvement of the live stock industry of Saskatchewan. He should be the executive head of the Live Stock Associations and of the new Stallion Inspection Ordinance. He will also have to see to the improvement of transportation, that means to try to arrange not only for cheaper but for more rapid and satisfactory transportation. He will also have to initiate and encourage movements for better marketing methods and better markets. In short, his office should be the centre of all the practical movements for the improvement of the live stock industry in Saskatchewan, and he will naturally assist the Dominion Live Stock Branch in all matters undertaken by it for the betterment of the live stock industry.

Before I pass on to give you figures to show how all these different measures of the government have succeeded in stimulating interest in the live stock industry in Saskatchewan, I shall not forget to mention one very important industry, the dairy industry, that has been fostered by the present government through the creation of a dairy branch. When Saskatchewan was created a province there were four creameries under the control of the old Territorial government, but very little interest was shown by farmers. This is proven by the fact that only 213 farmers were supporting these creameries and the output was only about 65,000 pounds a year. The Saskatchewan government created a very strong dairy branch under a capable superintendent. It also engaged two dairy instructors and supported the dairy farmers in cow-testing measures. It has also started to hold annual dairymen's conventions, and has succeeded so well in stimulating interest in dairying that to-day we have nine big creameries under government control besides five other big private creameries.

The output of the nine government creameries has risen from 65,000 pounds in 1905 to approximately 700,000 pounds in 1911, and including all the fourteen creameries to 1,000,000 pounds.

In the early days of creameries in Saskatchewan, there were no winter creameries, but in 1907 the first start was made to encourage creameries to keep open during winter, and to-day four creameries under government control have an output of butter during the winter season equal to that of the annual output of all the creameries

under the old Territorial government. While in 1905, only 213 farmers were patronizing the government creameries, now over 2,000 farmers are patronizing them.

This is certainly a very encouraging fact and we hope, if we are able to carry out the plans I have mentioned regarding bull sales of dairy breeds in dairying districts, to give further encouragement to the dairying industry. The Saskatchewan Local House has also voted every year quite a considerable amount for the interest of the live stock industry; in fact, they have annually increased this vote so that we are able to do a little more each year. Now you will ask me what effect all these measures have had regarding the actual figures of live stock in Saskatchewan, and while they are not as gratifying as I could wish them to be, they are not entirely discouraging.

The following table shows the number of each kind of live stock in Saskatchewan in 1910 by crop districts:—

Crop District.	Horses.	Milch Cows.	Other Cattle.	Sheep.	Swine.	Poultry.
1 South Eastern		66,388	126,277		101,995	1,352,701
2 South Central	73,850	15,742	37,141		43,314	709,734
3 South Western		6,000	60,488		7,276	183,705
4 East Central	66,915		132,500		56,805	740,938
5 Central			75,570	6,165	72,062	1,008,326
6 West Central		6,948	17,887	544	13,632	196,843
7 North Eastern	4,320		10,195	815	4,673	58,772
8 North Central	22,979		42,767	5,912	18,426	200,046
9 North Western	16,841		24,480	895	10,863	175,053
Total for Province	184,905	95,078	527,305	14,331	329,046	4,626,118

TABLE showing the increase in numbers of Live Stock from 1901 to 1910, inclusive.

Year.	Horses.	Milch Cows.	Other Cattle.	Sheep.	Swine.	Poultry.
1905 (estimated)	190,000	90,000	310,000	111,000	100,000	
1906	240,566	112,618	360,236	121,290	123,916	
1908	343,863	179,722	565,315	144,370	426,579	3,411,052
1909	429,776	233,548	594,632	152,601	352,385	4,343,643
1910	552,574	224,745	527,305	164,855	329,046	4,626,118

If we ask ourselves whether these figures I have just given you are really satisfactory, then we have to admit that while they are not entirely discouraging, they are not satisfactory, especially if we compare them with the tremendous increase of the grain growing industry. To make this plain to you, I will give you just a few figures comparing the growth of the grain growing industry and the growth of the live stock industry.

WHEAT.

Year.	Total No. Bushels.
1905	26,000,000
1910	93,000,000

OATS.

1905	19,000,000
1910	103,000,000

BARLEY.

1905	1,000,000
1910	6,500,000

FLAX.

1905	500,000
1910	5,500,000

1910 field crops were valued at 92½ million and live stock at 102 million dollars, and in addition to these facts we have to consider that the figures given for grain growing represent practically the yearly revenue out of the soil, while the live stock values represent the total value of the existing live stock.

If you were to ask me how much money Saskatchewan has derived out of export of live stock, I could hardly put it higher than about $3,000,000, while the profits derived out of export of grain are at least $50,000,000. These figures alone will show you what tremendous wealth and fertility is taken annually out of the soil of Saskatchewan and sent away, and I do not think that I am saying too much, in the face of these big figures, regarding grain production and the small figures pertaining to live stock production—when I state that our Saskatchewan farmers at present are robbing our soil of a tremendous wealth. I think it is high time that some stop should be put to such farming methods, because the farmers are not only robbing themselves but they are robbing the coming generation and the community at large. This fact has already been realized by men of good judgment, but the great bulk of the farmers still keep on in their old way of exploiting the soil of Saskatchewan.

I wish that we could induce the farm papers of Canada to have every week at least one editorial article setting forth to the western farmers the importance of changing their farming methods and of starting what we generally call mixed farming. I know that quite a few such appeals have been made by the papers and have been made by men who have seen the situation clearly.

Just the other day I saw a short item in one of the leading western farm papers written by a western farmer which reads as follows:—

> The live stock industry of the west is, so far as I am able to judge, not even holding its own in spite of the tremendous progress which the country is making, and if things are allowed to go on as they are doing for five or ten years longer, much of the rich wheat land will be completely exhausted, while, with climatic conditions to be encountered, it will be a matter of many years and much difficulty before the fertility can be restored. The average annual yield of wheat, even with frequent summer fallowing, is to-day on the Portage plains scarcely one-half what it was when the land was first broken and, with the history of the rest of this continent behind us, it seems to me that no effort should be spared to induce our prairie farmers to go in strongly for live stock and mixed farming before it is too late.

I am glad to see that now at some of our grain growers' meetings the grain growers are also discussing the subject of mixed farming, and the keeping of more live stock.

Should our Saskatchewan farmers not believe their own countrymen, but prefer some outside opinion, according to the old saying that the prophet is not without honour except in his own country, I can give them just a few lines taken out of a prominent American paper. The little item reads as follows:—

> Canada has gone to growing grain, and is so neglecting stock that it is buying of us and is likely to continue doing so; we are convinced that this is a wrong turn to take, for if Canada is anything that is distinctive it is that it is a natural grazing country, and some fine day the discovery will be made that it

is live stock and not grain that makes land rich. As it looks now, the Canadian Northwest is following exactly in the footsteps of our own prairie states, which in their turn followed the eastern states in using up the surplus soil fertility as soon as possible, making all haste to turn it into money, and then hunting for more soil somewhere to serve in the same way.

Now, I do not think I need say anything more to prove to you how important it is to stop the present system of farming in Saskatchewan and the western provinces. Their present way of farming—at least the way 90 per cent of all the western farmers are farming, should be made a criminal offence and put, if possible, in the criminal code, but we all know that this is impossible, and for this reason we ought to try and find some means to reach the western farmer and to point out that after all the keeping of live stock will be the only means of maintaining the fertility of the soil. If you ask me what we shall do to make such a change of conditions and how we can improve and stimulate the live stock industry of Saskatchewan and of the Dominion as a whole, I could probably tell you, 'Oh, let us go to the government and ask the government to put a duty on such and such a thing and take the duty off such and such another thing and give as a grant of $50,000 for one thing or $100,000 for something else, and then let us just sit quietly in our chairs, fold our arms and see what good will come out of it for us.'

I am sorry I will have to disappoint many live stock men in Saskatchewan and in Canada by not falling in line with such a proposition, because, while I certainly know that we must have legislation regarding such matters, and while I also know that we must have government support, I claim that first of all the live stock men of Saskatchewan and of Canada have got to show that they are alive themselves and that they are willing to do something themselves.

I think, Mr. President, the remarks of the Honourable Minister of Agriculture in the Dairymen's Convention of Ontario, when he told the dairymen that the government was certainly willing to assist them in every way possible so that *they could help themselves,* goes right down to the very reasons why our live stock industry is not what it should be, and it shows us clearly what we, on our part, should do as live stock men. Many of us are relying too much on government help, and are only too willing to accept government assistance without making strong enough efforts ourselves to use this assistance in the right way.

The breeders in the districts of Canada, or more especially in Saskatchewan, could do very good work if they would join together in the different breed districts in a co-operative way, and I believe that the different breeders' associations could employ many means not only to improve the several breeds but also to stimulate the interest in these breeds. As it is at present, I find that in most meetings of these associations, only routine business is done and very little actual work is accomplished. Some may pass a few resolutions but very few will settle down to discuss actual means as to how to improve the breed and how to create a greater interest in the breed.

To illustrate my point, I wish to mention an incident that happened about a week ago at one of the breeders' meetings in Toronto. After the minutes of the last meeting had been read and after the grants had been voted and other routine business completed, the president read his address—an address full of valuable thoughts and suggestions for the improvement of this particular breed. After he had read his address, the meeting passed on to the election of officers, and during the counting of the ballots, one of the members stood up and made some remarks of appreciation regarding the address. Others followed and enlarged on these remarks of appreciation, but with this practically the whole interest in the address ended. It might reasonably have been expected that at least some committee would have been appointed to report at the next meeting on the address, or even better, right at the same meeting or at a special meeting for that purpose.

Of course, I am certain that we also must have the most hearty support of the Local government as well as of the Dominion government if we want to improve the conditions regarding live stock; in fact, I think it is only through the united efforts of the two governments that real good can be done for the live stock industry. All the means of stimulating live stock interests which I have mentioned before as being employed at present by the Saskatchewan government should still be used and even improved on. There should also be started a strong educational campaign throughout the country, not only to teach the farmers the importance of keeping of good live stock, but also to keep the farmers informed regarding the different breeds and the most suitable breeds for their districts. They should also be kept posted regarding the most up-to-date breeding and feeding methods. Steps like the one taken by the Dominion Department of Agriculture regarding the sheep industry are highly to be commended.

Furthermore, I think the governments should pay a little more attention to the keeping of good live stock on their experimental farms in the various provinces; in fact, should probably start some demonstration farms on mixed farming methods in the different districts. Last but not least, every government, Dominion as well as Provincial, should have a strong live stock branch with great and extensive power and authority, because we should remember that grain growing and live stock are equally essential for agriculture, and for this reason live stock interests should be put on an equal footing with grain growing interests.

I am sorry, Mr. President, that I have taken probably a little more time than was coming to me for this address, but my great love for live stock in general, and for Saskatchewan live stock in particular, has made me do so. I have given my report conscientiously just as conditions are, knowing that we are not assembled here to solicit favours on behalf of our own affairs or of those of other people, but to learn what are the actual conditions. While I, in consequence of this, had to show many dark spots in our live stock conditions, I was also able to show and report on many bright things. Where there is light there are shadows everywhere in life, and the live stock conditions of Saskatchewan, while they are by no means what they should be, are not at all hopeless. On the contrary, I think if the means used at present are continued and improved upon and other new suggestions accepted and added to them, that the man who will have the honour to report at a future National Live Stock Convention on this subject should be able to tell us of the great growth and progress made in the conditions of live stock husbandry in Saskatchewan.

I thank you, Mr. President and gentlemen, for the honour you have done me in asking me to report to you on this matter, and I must ask your forgiveness for the poor way in which this report has been given. I am sure there are many men present here from Saskatchewan who could have done this in a much better way than I have, and I hope the next time a more capable man will be in my place. There is one thing, however, I am sure of—no other man will be able to make his report in a spirit of greater or more ardent love for the live stock industry of Saskatchewan and the whole Dominion than I have done. I hope that you have felt this right through my whole report, and that for this reason you will excuse me if I have at times used strong language, because I think that very little good can be accomplished if we handle these present conditions with gloves. Strong measures and strong language are needed, in my opinion, to wake up the careless and indolent farmers of the west (for I speak only for the west.) We want to succeed in making the live stock industry of the west, and more especially of Saskatchewan, what it ought to be. 'Succeed we must,' this should be our guiding star.

Meeting adjourned.

SECOND SESSION.

Mr. ROBERT NESS, President of the Association, in the chair.

The CHAIRMAN.—I will ask the secretary to read some communications before we commence the proceedings of this afternoon.

Mr. A. P. WESTERVELT.—I wish to give you some information as to what was done at the meeting of the executive this morning with regard to some additional associations that will be represented at this meeting. Applications were received from several provincial associations that had not previously been affiliated. These associations are as follows: Saskatchewan Horse Breeders' Association, Saskatchewan Cattle Breeders' Association, Saskatchewan Sheep Breeders' Association, Saskatchewan Swine Breeders' Association, Ontario Sheep Breeders' Association, Ontario Yorkshire Swine Breeders' Association, Ontario Berkshire Association, Maritime Farmers' and Dairymen's Association and the Maritime Sheep Breeders' Association. It was recommended by the executive that the applications be accepted. We also received applications from some associations in Alberta: the Alberta Provincial Cattle Breeders' Association, Alberta Provincial Horse Breeders' Association, Alberta Provincial Swine Breeders' Association, Alberta Provincial Sheep Breeders' Association. These applications from Alberta were considered by the executive but the applications, unfortunately, were not quite in the form prescribed by the constitution. Mr. W. J. Stark is secretary of these associations and a resolution was passed, pending the approval of the associations that I have just named, that Mr. Stark should be added to the list of membership for this year. The ordinary representation would be: president, vice-president and secretary, but this information was not available. Mr. Stark is here as secretary of the associations, and it was decided to recommend that these associations should be represented by Mr. Stark.

It was also recommended that Mr. Hull, of Kamloops, should be made a member of the association. These are the recommendations of the Executive Committee.

(Moved by Mr. Graham, seconded by Mr. J. E. Brethour, that the recommendations as read by Mr. Westervelt be adopted. Carried.)

Nominating Committee.—Professor M. Cumming, Lieut.-Col. Campbell, Mr. John Bright, Dr. J. A. Couture, Mr. W. W. Ballantyne, Mr. John Scharff, Mr. Paul Bredt, Mr. George Lane, Dr. Tolmie, Mr. Theodore Ross.

Committee on Resolutions.—Mr. William Smith, M.P., Mr. A. W. Smith, Mr. N. Garneau, Mr. C. A. Archibald, Mr. James Telfer, Mr. Theodore Ross, Mr. William Duthie, Mr. Robt. Sinton, Mr. George Lane, Mr. Alex. Davie, Col. Campbell, Col. McEwen.

Committee on Constitution.—Mr. A. W. Smith, Mr. H. S. Arkell, Mr. Robert Miller, Mr. Peter White, Mr. A. P. Westervelt.

The CHAIRMAN.—The resolution proposed by Mr. Bright this morning will go to the Committee on Resolutions.

Col. MCCRAE.—I think we had better pass it.

The CHAIRMAN.—It was put to the meeting this morning and carried.

We have a telegram from the Vancouver Horse Show Association and considerable correspondence. I would suggest that it be handed over to the Committee on Resolutions. (Carried.)

Mr. R. REID.—I move that a committee consisting of the delegates representing the different dairy breeds, take into consideration all matters pertaining to dairying and dairy breeds and report to the meeting to-morrow. I take issue with the

statement made this morning that there is more money in the horse business than in any other live stock industry in Canada. I think it is the money from the dairy industry that makes the mare go.

(Motion seconded by G. W. Clemons.)

Dr. RUTHERFORD.—I would like to have a little more light on this procedure. This convention is called for a specific purpose and we have a very full programme. What is the particular object of these motions? The dairy interests have received every consideration on the programme.

Mr. GEORGE LANE.—I think the reason Mr. Bright asked for his committee is in order to get a better understanding of the horse situation.

Col. MCCRAE.—I think it is all right to have these committees. They will have plenty of time to meet and make their report after the meeting this evening.

Mr. REID.—It is the intention of the dairymen to meet at the close of the meeting and not to interfere with the programme.

A MEMBER.—I move that the order of business as indicated by this programme be followed. (Motion seconded and carried.)

The CHAIRMAN.—I now have much pleasure in calling upon Dr. J. A. Couture, of Quebec, to address the convention on the 'Present Conditions of the Live Stock Industry in Quebec.

PRESENT CONDITIONS OF THE LIVE STOCK INDUSTRY IN THE PROVINCE OF QUEBEC.

By Dr. J. A. Couture, Quebec.

Four years ago it was my privilege to address the second convention of the National Live Stock Association upon the same subject that is assigned to me to-day. In order that we might be judged more fairly, and consequently more favourably, I then thought it advisable to briefly outline the history of the live stock industry in the province of Quebec from 1750 to 1880, summing up the situation as follows: 'Quebec has devoted itself to dairying, the raising of a general purpose horse, the production of bacon, but is lamentably neglecting sheep raising.'

Our situation cannot have changed much in four years. However, it has been modified to a certain extent, and it may be profitable to ourselves and interesting to others to examine it under present circumstances. I will endeavour to perform that task as briefly as possible.

As I have just mentioned, Quebec has devoted itself, since 1880, to dairying, which policy has produced the most gratifying results, and improved considerably the condition of farmers. Thus, the production of cheese, which was only 512,436 pounds in 1871, amounted to 80,630,199 pounds in 1901, while our production of butter increased during that period from 24,000 pounds to 43,000,000 pounds.

Cheese making and butter making has been, until recently, the watchword of our farmers. The cows of the province numbered 328,000 in 1881, but they will probably number much over 1,000,000 in the pending census report. The milk production per cow has also greatly increased. There were only a few cheese factories in 1871. In 1910, according to the official bulletin published last summer by the Department of Agriculture, the cheese factories, creameries and combined factories numbered 2,165.

This marvellous development of dairying could not but be accompanied by an improvement in general farming, and could not fail to make our agriculture relatively prosperous. Thus, in 1895, the farm products of the province were double the quantity they had been in 1880; in 1910, they were double what they were in 1895.

Several counties where, in 1895, hay only was grown export, at present, just as much hay as in 1895, besides dairy products for which they receive as much money as they got for their hay.

In some other counties, as in the Eastern Townships, dairying has completely changed the condition of things. Twenty years ago there were, in that section of the province, not to speak of the Cochranes and Popes, several breeders of pure-bred Shorthorns and Herefords. Moreover, most of the farmers, at that time, kept non-registered, but pure-bred milking Shorthorns, which were in great favour with the milkmen of Quebec and Montreal. They were good cattle, and it is a pity that no record book has been opened for them. In the eighties 3,000 head of these cattle were sold annually for beef in Montreal. There are now no more of these cattle in the Eastern Townships, they having been replaced by the Ayrshires and Holsteins. As regards pure-bred Shorthorns and other beef breeds, we have at present but a few herds.

With the expansion of dairying the farmers have favoured the Ayrshire, Holstein and French-Canadian breeds of cattle, especially the two former. Ayrshire cattle, both pure-bred and grade, are by far the more numerous. They may be found in all parts of the province, even the remotest, and are becoming more popular every day. This is due to the fact that our breeders of that class of cattle are among the most renowned of North America, and also to the large number of Ayrshire cows that are being tested every year with excellent results in the Record of Performance. I may say in passing that there are 730 breeders and owners of pure-bred Ayrshires in Quebec.

The Holstein cow has gained much ground during the last four or five years, thanks to their being well advertized in the press and the show ring, and to the wonderful performance of some of them. Many people think that all Holstein cows will give 20,000 pounds of milk in a year and this idea favours purchases. I am informed by Mr. Clemons that there are 120 members of the Holstein Association in Quebec. The number of grade Holsteins is steadily increasing.

The French-Canadian cattle are not increasing much in numbers in comparison to the two other breeds. They are not advertised properly; the fact is they have never been advertised and there are not enough records of herds and of individuals. Recently they have become popular with the wealthy city people, and several Montreal millionaires have gone in for these cattle. But it cannot be said that they gain much ground. There are 150 herds of pure-bred French-Canadian cattle in the province.

The Jerseys are decreasing in numbers; the Guernseys are stationary.

Summing up the situation as regards cattle, I would say that we no longer keep beef breeds of cattle; that, practically, all the cattle in the province belong to the three dairy breeds already mentioned; that the Ayrshires are foremost in the race, the Holsteins are good seconds and the French-Canadians are keeping the rear.

HORSES.

Previous to 1893, we had gone in to some extent for the Standard bred, to a less extent for the French Coach, but more generally for the draft horse, not to speak of the French Canadian horse, which the French Canadian Horse Breeders' Association was endeavouring to preserve and improve.

You are all aware of what happened in 1893. The numerous horse ranches, which had been in existence for about five or six years, sent thousands and thousands of horses to market. Electricity was substituted for horses as traction for street cars, and the tramway companies threw 500,000 horses on the market. Horses got so cheap in this province that farmers entirely gave up raising them, and, for ten years they hardly gave a thought to horse-breeding. Whenever they wanted a horse they bought him from the traders. In several sections of the province, as for instance in the

counties of Chicoutimi, Lake St. John, Saguenay, Charlevoix, in the lower part of the province south of the St. Lawrence and in the neighbourhood of cities, that same condition of affairs still prevails more or less.

With but a few exceptions, as in the counties of Beauharnois and Huntingdon where the draft horse has been raised for the last forty years, horse-breeding has been carried on in the most unsystematic and haphazard way, the small French-Canadian mares being mated for a time with stallions of the various draft breeds, then with the Standard bred, then again with the draft horse. The result has been that we have no horses to speak of, with the exception of the incipient French-Canadian breed, which is being made up by the French-Canadian Horse Breeders' Association.

As regards that new breed I may say that it would perhaps be more proper to call it the *Canadian breed of horses* since the old breed of French-Canadian horses is now almost extinct and cannot be resuscitated. But something approaching to it is being made up.

The association has selected several hundred good, very good, sound and active mares of the same type, most of them presenting many characteristics of the old breed, weighing about 1,100 pounds and standing between 15-1 and 15-2, which are being used as foundation stock, and which will be mated with stallions of the same type. A large number of these mares are found in four sections of the province, namely, one comprising the counties of Montcalm, Joliette and Berthier, another comprising St. Hyacinthe and Bagot, a third comprising St. Johns and Iberville and a fourth comprising Gaspé county.

The association is making arrangements to secure stallions which will be placed for service in these four sections alternately. Others of the same stamp will follow until the type is permanently fixed.

Surely it will take some time before the breed is made up, but the association knows exactly what it wants, what it is aiming at and what should be done to make up the breed, and, if it perseveres in its efforts, there is no reason why it should not succeed.

Outside of these four sections of the province the draft horse will, in the long run, predominate, for the Clydesdale, the Percheron and, recently, the Belgian draft horse are much in favour almost everywhere. It will, however, take a long time before we have a class of good uniform drafters, unless farmers are taught to carry on horse-breeding in a systematic way, and this should be done as soon as possible.

The Canadian National Bureau of Breeding has begun a useful work in placing Thoroughbred stallions at the service of breeders and farmers at a nominal fee. Up to now only a few of them have been placed in Quebec, but the number will increase as the bureau's work goes on. This should have a beneficial effect upon the light horse industry of the province, and should be encouraged especially for those sections where the French-Canadian mares are most numerous.

The marvellous development of dairying, together with that of the textile industry, caused our farmers to neglect sheep-raising. Formerly clothing was made at home and every farmer kept a small flock of from ten to twenty sheep for that purpose.

The times have changed and the sheep industry has declined considerably owing, mainly, to that comparative prosperity brought on by dairying, and which seems to have put in the farmers' minds that it is foolish nowadays to bother about sheep; owing also to dogs in some localities, and to the low price of wool and mutton.

The official figures for July last give 533,400 sheep for the province of Quebec. But I would be much mistaken if there are more than 250,000.

My calculation is as follows: There are seventy-four counties in the province. From that number must be deducted seven city ridings, four adjoining the cities and six others where no sheep are raised. That leaves fifty-five counties or 1,100 parishes where sheep are being kept. Let us say that twenty persons in every parish keep ten head each (that is certainly an exaggerated estimate), and we have a total of 220,000

sheep for the whole province. But whether we have that number or 500,000, we should be keeping ten times more.

However, it is gratifying to be able to say with Mesrs. Dryden and Ritch in their report, 'That there is a nucleus, both of inclination and of practice around which it should not be difficult to build up an extensive and satisfactory trade in mutton and wool. The taste of the farmer is by no means averse to the ownership of a small flock, and there is that in the style of his life and work which peculiarly fits him to give that flock good care. It is questionable if a careful, systematic campaign, in the interest of sheep-keeping, would anywhere give better results than in Quebec.'

My time is too limited to discuss the possibilities for sheep-keeping, on hilly and level land, in Quebec. Suffice it to say that those possibilities are great, that the breeders' association is fully aware of them, and has a definite, comprehensive and practical policy which has been outlined in my last report to the Live Stock Commissioner.

That policy has three objects in view. First—to carry on a campaign of education upon sheep-raising; Second—to induce every farmer to keep a small flock of not more than ten ewes; Third—to advise the farmers of one section (parish or county) to keep sheep of the one breed or, at least, of the one kind (long wooled or short wooled). In connection with the latter suggestion I might say that the farmers of a section of the Lake St. John county have already agreed to keep on breeding with short-wooled sires, so as to gradually render the flocks uniform.

That policy can be carried on in two ways: First—by holding annual sales of pure-bred breeding stock, so as to help improve the flocks already existing; Second—by supplying *free* one ram to each club of five members who are not already keeping sheep but who will get at least five ewes each.

The object of the public sales is two-fold. First—to give those who already keep sheep an opportunity to get good sires, at a reasonable price, and without loss of time and unnecessary expense; Second—to give breeders of pure-bred stock a chance to sell, at a profitable price and at a determined period, all the good stock they can raise.

The public sales have been established and have proved successful. One was held in 1910, when 123 sheep were put up for sale. They were sold at a loss of $2.63 per head. Another was held last fall when 193 sheep were sold and realized a profit over the purchase price of $349. In both cases the demand was larger than the supply. This year the association will put up for sale 300 head.

The association is enabled to make these sales through the help given by the Federal and Provincial governments; the former paying for the transportation of the animals from the points where they are bought to those where the sales are held; the latter assuming the deficit caused by the expenses incurred in connection with the purchase, the sale and the shipping of the animals to the buyers.

The second part of the programme, viz., the furnishing of pure-bred sires *free*, to clubs, is being considered by the Provincial Department of Agriculture with good prospects that it will be approved.

But to make a success of the undertaking the beginners would have to be instructed and encouraged. Therefore, arrangements would have to be made to secure the services of expert shepherds, whose duty it would be to educate the farmers so as to prevent failures, which would tend to discourage not only those who failed but others also. The undertaking must be a success from the start.

If that programme is carefully followed, Quebec will have within the next ten years tenfold the number of sheep she has at present.

There is not much to be said as regards swine. Some fifteen years ago it looked as if our farmers would take to the production of the bacon pig, as they had taken to dairying. But for some reason or other they gave up the undertaking as unprofitable, and they remain satisfied with supplying local markets. However, they are willing to improve their stock and they are improving it mostly with the Yorkshire and Chester.

The Stock Breeders' Association has undertaken to stimulate the swine-breeding industry, and, with that end in view, has inaugurated its annual sales of breeding stock, of which two have already been held. At the first, 64 animals were put up for sale and there was a deficit of $65. At the second 93 head were sold and there was a profit of $1. The third sale, which will be held next fall, will comprise 150 animals.

We are confident that these public sales will be sufficient to gradually increase the number of swine, until a profitable market is found for the surplus production, which cannot but be realized as the result of the association's work. At present that market is wanting.

Before leaving the subject I might say that no other province of the Dominion is better prepared to accept and put into practice a programme having in view the development of animal industry, provided it is started on right lines, and provided also that the Dominion and Provincial governments work hand in hand with the Stock Breeders' Association.

PRESENT CONDITIONS OF THE LIVE STOCK INDUSTRY IN BRITISH COLUMBIA.

Dr. S. F. Tolmie, Victoria, B.C.

I have been requested by your directors to say a few words regarding the present live stock conditions in British Columbia. In the limited time allotted to me, I will not be able to go thoroughly over the subject.

I come from a province that is about 800 miles long and 600 miles wide. British Columbia for many years to come will be a great consumer of live stock products. I will quote, therefore, the market prices as I go along. With the great development going on west of the mountains, both in the way of opening up fresh areas and in building railways and the general prosperity existing out there, it is no matter for surprise that British Columbia has proven a very profitable market for live stock products. The increased cost to the consumer has been a cause of complaint from some quarters, but when one takes into consideration the fact that the farmer out there is paying bigger wages to-day than he ever did before, and that the consumer is enjoying better times than he ever did before in the history of British Columbia, I do not think the farmer is getting too much for his products.

Looking to the future, I think the market is going to increase at a rapid rate. Our resources other than those relating to agriculture are very great. We have huge areas of timber land, valuable fisheries and mines. Our agricultural land is rather limited in comparison, and at coast points it requires a good deal of money to bring the land under cultivation. It is pleasant to know that our pure-bred stock breeders are keeping up-to-date. The exhibits of pure-bred stock at our exhibitions have been greater than in any previous year and of a better quality. Among other things exhibited this year was a Holstein cow, bred in British Columbia, that was yielding nearly 100 pounds of milk per day.

The Provincial government is showing a very lively interest in the development of agriculture and they have established a farm at the Fraser river, consisting of about 1,000 acres, which is in connection with a hospital for the insane. They have equipped this farm with high class Clydesdale horses, Hackneys and Thoroughbreds, and they have placed on it a first-class herd of Holstein cattle and have put up buildings of the very latest design. They propose conducting it as a demonstration farm so that it may be visited by the British Columbia farmers at any time. They also intend to hold annual sales of stock where the farmer can obtain the very best. It is difficult to estimate the immense value it will be to the live stock breeding interests of British Columbia.

Looking at British Columbia from a live stock standpoint, it would be well to divide it into two sections. First we have that section lying to the west of the Cascade mountains, including the islands of the coast. In this area we have sufficient rainfall to carry on agricultural pursuits. In the valleys lying to the south of the mountains, we do not have sufficient rainfall to obtain the best results and we have to irrigate the land. When I refer to the range country, you will know it is that section in the valleys to the east of the Cascade mountains.

There has been a very strong demand for draft horses in British Columbia for some years past. Horses that were suitable for working purposes have been bought at very good prices. At the present time, horses running from 1,400 pounds to 1,550 are sold for from $500 to $700 apiece. If they weigh 100 to 200 pounds more they will run to $900 apiece, and a horse weighing 1,800 or 1,900 will bring as high as $1,000 or $1,200. We also have a fancy market for high class, smooth, nice quality, well-mannered and well matched horses. These are bought by big farmers out there who compete at our horse shows and they pay as high as $1,600 per team. Owing to the fact that the market has been pretty well supplied during the past year and that our American friends are shipping in very good teams, the demand is not nearly as good as it was a year ago, and I would advise any of you who are contemplating shipping horses to investigate the market before doing so. The ranches of British Columbia are noted for producing horses of very good quality that will stand hardships, that have excellent feet and that are remarkably well muscled, but, owing to the fact that the foundation stock is not well selected, that the horses are produced on wholesale lines and are not given much care, they are not supplying the demand.

An institution that is most urgently needed in the range country of British Columbia is an experimental farm where experiments could be carried on in connection with farming under irrigation conditions and where experiments could be conducted with plants which thrive well in arid or semi-arid regions in other parts of the world and where experiments could be carried on with pumping plants for irrigation purposes. There is no trouble in securing capital to bring water twenty-five or fifty miles where you have plenty of land to be irrigated, but there are many parts of British Columbia where there is not enough land to grow hay to sustain the stock through the winter. If water could be put on the land at low cost by machinery that would pump it from the river, a good profit could be made. Years ago when cattle were first put on the ranches, the grass was twelve to fifteen inches high and there was plenty of it. The cattle at that time would fatten very rapidly, but the ranchmen over-stocked the ranches and they are not nearly so valuable as they were years ago. Experiments might be conducted along the line of re-seeding these ranches. The greatest drawback to the successful production of live stock on the ranches of British Columbia to-day is the inability of the rancher to produce sufficient feed to carry his animals over the winter at low cost.

While it must be admitted that the automobile and other mechanical devices have cut in on the horse business, still there is considerable demand for light horses of good quality that will sell, according to the quality and the speed they possess, for from $250 to $500 per head. Of course Standardbred horses, possessing enough speed to race well, sell for a good deal more money. Another feature that is playing a very important part in connection with light horses is the inauguration of the horse shows. We are holding horse shows in Vancouver and Victoria and New Westminster, and they have made wonderful growth in recent years. In fact, it has been stated by eastern judges that the horse show put up at Vancouver is second only, on this continent, to the show at Madison Square Gardens. These shows have provided a market for fancy high steppers, saddle horses and hunters.

From about the 30th of June to the end of the year, we obtain a large amount of our beef supply from the ranches of British Columbia, but during the balance of the year, we have to depend on Alberta for our supply of cattle. Many of our large

ranches have been cut up and they are now producing the big red apple that is making British Columbia famous. At one time it was quite possible to produce beef cattle in the Fraser River district, but now we find the farmers giving up beef cattle and going into dairying, and they are selling their milk in the cities and obtaining very good prices. The average wholesale price for milk in British Columbia is from 20 cents to 21½ cents per gallon. This high price has had a very bad effect, many of the farmers having given up raising their heifer calves, with the result that good dairy females have become scarce and in some districts cannot be obtained at all. It is not an unusual thing for a man to receive $150 for a first-class dairy cow. In fact, at a sale held south of Vancouver, dairy cows sold for as high as $211 apiece and many sold for from $150 to $200, and eight yearling Holstein heifers sold at an average of $141 per head, showing that there is a good demand for dairy animals. As far as the future is concerned, there is good promise of a large market in that country for dairy products.

Since the 1st of January, we have received opposition from a quarter we did not expect. Owing to the quiet times in Washington State, some of the condenseries immediatly south of the line have found difficulty in disposing of their milk, with the result that they have closed down and they are now flooding the city of Vancouver with American milk. It is being sold at a figure much lower than the price the Fraser Valley farmer has received, and I am afraid it will have a disastrous effect on the dairy industry in that particular region.

It is very pleasant to know that the breeders of pure-bred dairy cattle are taking a very great interest in the Record of Performance in British Columbia, and I do not know of anything brought forward by either the Dominion government or the Provincial government that will have better results than the introduction of this Canadian Record of Performance. It places in the hands of the purchaser a means of finding out exactly what an animal can do, and he is not compelled to take the nice smooth story he had to take five or ten years ago. We have a British Columbia Dairymen's Association, and this year the two-year-old Ayrshire heifer owned by Mr. Joseph Thompson made a record of 10,446 pounds of milk and 381 pounds of butter in the year. She was not kept under forced conditions and was only milked twice a day, and she won a cup donated by His Honour the Lieutenant Governor. It is always a good sign when you see officials in high places taking an active interest in agricultural matters.

Another record that was made was that by a Holstein cow owned by Mr. Stevens, that gave 2,104 pounds of milk and 84 pounds of butter in thirty days, and I think that is very nearly the Canadian record. When we take into consideration the rich delta land of the coast and on Vancouver island, where we have very little winter, it will be understood that it is quite possible for the animals to graze outside, the year round, if they are fed a little at night. The grass grows twelve months in the year. Under these conditions, I expect that British Columbia will yet be producing some of the best dairy cows in Canada.

I regret to say that the sheep industry has not made very great progress. We are still importing a large amount of mutton from the United States, Australia and New Zealand. I think this situation is largely due to the low price of wool and in some cases to the ravages of panthers, wolves, prairie coyotes and dogs. While the mutton sheep are not increasing, the breeders of pure-bred sheep are keeping up the qualities of their flocks and holding their own. It is a deplorable fact that in a country like British Columbia, we should find it necessary to import thousands of sheep from the State of Washington, where they are produced under conditions almost identical with those on our side of the line.

The swine industry has about held its own, but we are still importing large numbers of live hogs from Montana and also an immense amount of bacon and hams. Hogs can be produced very profitably in British Columbia, and I think more attention

will be paid to hog raising in the future. We prefer a medium length hog, and good Tamworths, Yorkshires or Berkshires will sell at from $20 to $40.

During the year 1910, some forty-three agricultural exhibitions were held. The government assisted these exhibitions by a grant of $78,500, and in 1912 they will give $100,000.

We have a British Columbia Fairs Association which meets once a year, and this year they took up the question of standardization of prize lists so as to make them as nearly uniform as possible. Another matter dealt with was a resolution passed requesting all the larger exhibitors to produce certificates showing freedom from hereditary unsoundness of all stallions placed on exhibition, and I think we will move along these lines still further in the near future.

We are threatened with the problem of conserving the fertility of the soil. These lands of the west, if carefully farmed, will prove one of the greatest assets that Canada has, not only for this generation but for the generations to come. Our agricultural colleges, the press, the farmers' institutes and the Department of Agriculture are doing splendid work in trying to educate the farmer to intelligently take care of his land, and animal husbandry is receiving the greatest encouragement. Many men who are able to keep live stock are still following the system of cropping one particular kind of grain, and we must try to demonstrate to them at our experimental farm, by carefully kept accounts, that they can make more profit by changing their system and keeping some live stock. I think we might consider the advisability of appointing a commission to look into this matter and to find ways and means whereby the present condition could be improved. We might consider the desirability of adopting some measure of adjusting our taxes so that a man would have a slight rebate in his taxes in proportion to the number of animals he maintained on his farm. The man who builds up and improves his land is not only providing for this generation but for the generations to come.

I have taken up all the time allotted to me, but before sitting down, I wish to thank you and your directors for having honoured me with a place on your programme, and I wish to thank the audience for the very kind hearing they have given me.

INTERPROVINCIAL TRADE IN PURE-BRED LIVE STOCK.

Andrew Graham, Pomeroy, Manitoba.

The basal structure on which to build an interprovincial or any other kind of successful trade in pure-bred stock is, and always will be, dependent on favourable trade conditions for commercial stock. In fact these two phases of the live stock industry are so intimately related that neither can continue a successful existence independent of the other. This statement is made on the supposition of the existence of normal conditions. Under abnormal conditions, such as a brisk foreign demand for the best of our pure-bred stock, success might come for a time to the breeder of pure-bred stock, while the home trade in commercial stock languished; but this would only be an evasion of the rule, and the more enterprising foreigner would reap the reward that under conditions properly adjusted would have been gathered in by our commercial live stock interests.

While it is true that the success of the pure-bred live stock business depends upon a healthy condition of the commercial stock business, it is quite as true that, if we are to hold our own market and share in the markets of the world, it can only be by the liberal infusion of the very best blood available into our flocks, studs and herds.

Mr. Monroe, of Montreal, speaking at our last convention, from the exporters' view point, made it very clear that we were being completely routed from the British market by the Argentine product. That product, he said, was the equal of the very

best Ontario fed product. The reason assigned was that for years past the Argentine breeders had been purchasing, regardless of cost, the very best blood available in England and Scotland for the improvement of their flocks and herds and now they are reaping their reward.

John Bull has a very sensitive and well-trained palate, and he is very critical when it comes to a matter of roasts and steak, and moreover he is in a position to secure just what suits him best. If this morning's breakfast of Canadian bacon and eggs is not exactly to his liking, to-morrow morning he will turn to Denmark for his breakfast. If his porterhouse steak to-day, from the back of an American black Angus does not quite suit his taste, to-morrow he may sample Argentina Shorthorn or a Scotch Highlander; the only way to get his chink is to put up the goods.

This association accomplished a great work when it brought to a successful issue the work of nationalizing our records. Our standards are becoming the basis of standards in older lands.

The Scotch Clydesdale breeders protested strongly against our conditions, but now they frankly admit that meeting our regulations has sharpened up their breeders and greatly helped their records. We may well be proud of our system of one record for each breed. Sometimes we become a little impatient with what we consider the very exacting detailed requisites, in securing certificates of registration, but it is quite possible that in spite of the greatest vigilance on the part of the record officials, fraudulent entries will occasionally be secured. If there is any one line of business that, more than all others, requires uprightness and integrity in those engaged in it, that business is the breeding and handling of pure-bred stock. It is a business in which the honest man and the trade, as a whole, suffers irreparable loss from the few overgreedy and dishonest men in the business. Twenty-five years ago the Clydesdale was as popular in United States as the Percheron, but through the operations of a few unprincipled dealers and the bringing in of a lot of inferior stuff, the United States market was practically lost to the Clydesdale breed.

After untold loss and years of careful operations the prospects seem good for the Clydesdale coming to his own again in that country. The British Columbia market has been practically closed to the producers of pure-bred stock farther east, through misrepresentations made by parties shipping to that province. In fact, there is stock all through that country that is no credit to the breeds they are supposed to represent. This has resulted in great loss to eastern Canada, and made it easier for the breeders in Washington, Oregon, Idaho and California to do business with British Columbia.

At the last meeting of our association, Dr. S. F. Tolmie and Mr. Logan gave a large number of instances where local men had been shamefully victimized and their confidence betrayed to the great loss of the trade in general. Some eight or ten years ago eastern breeders had a good trade with the United States for the best of their cattle and sheep. At that time the western breeder was scarcely able to compete successfully with the American buyer. The result was that a lot of second-rate stuff found its way west.

This seemed rather unfortunate but unavoidable. A very serious aspect of the affair was that many animals, failing to pass the required tuberculin test for the American market, found their way west with results, in some cases, extremely disastrous, the details of which will never be written. I have dwelt at far greater length than I intended on this phase of the subject, but the loss resulting to the business in general through the crooked transactions of a few would be hard to overestimate. I consider it to be the duty of those entrusted with the keeping of our records, and the duty as well of every breeder of pure-bred stock, to have our records and every pedigree in those records exactly what it purports to be.

I have found it simply impossible to get any figures to enable me to even approximate the amount of business done between the several provinces. There was a time

when Ontario was almost the only source of supply for those in search of pure-bred stock. This does not apply altogether to dairy cattle, for Quebec has long been noted for her splendid dairy herds. Of late years splendid studs, herds and flocks have been well established in every province of the Dominion. These, naturally enough, have become distributing centres for their own community, and while interprovincial trade may not have flourished as in earlier years, still the amount of business has doubtless increased to a considerable extent.

The horse trade of Canada is in a very flourishing condition and promises to continue so, as long as the multitude from the eastern world continues pouring in to our western provinces. Canada, especially western Canada, has made wonderful strides in the last few years in the improvement of the quality of her horses, but I think I would be quite safe in saying that the value of the horse produce of almost any farming district in Canada could be doubled in a very few years by the judicious selection and use of sires best adapted to supply the demands of their particular market.

There is a heavy movement of commercial horses from east to west, but the interprovincial trade in pure-bred horses is not very brisk. Western breeders and dealers have struck the trail to the fountain head from which large drafts are being made of the best procurable in the old land. A few years ago there appeared to be some doubts as to western Canada's fitness to produce the best kind of draft horse, but all fears along that line have forever vanished, and we are satisfied that with the same opportunities for selection in breeding we can produce as good a draft horse as can be produced in the world. If eastern Canada would continue to do a good business with western Canada in pure-bred horses their offering will require to be of a very high order of merit.

The interprovincial trade in pure-bred cattle seems to have waned somewhat, especially in beef breeds, which may be partly attributable to the establishment of good herds in the several provinces, but let trade in commercial cattle get into a prosperous condition and the demands on eastern herds will once more assume large proportions.

Eastern sheep breeders are likely to have a brisk trade with western Canada. With the passing of the coyote and the advent of a better style of fence, sheep seem likely to come into great favour in the west; not only for their wool and mutton produce but also for the purpose of eradicating weeds. First-class rams as flock headers should be in great demand. These will have to be ordered by mail, and the man who is prepared to furnish a first-class article and hand out a square deal will be the man who will get the business.

Up till the last two years there has been lively business from east to west in pure-bred hogs. The establishment of good western herds is partly responsible for the falling off, but the unsatisfactory condition of the pork trade is the main cause. Excessive express rates make it very discouraging for western Canada to do business with Ontario in hogs, sheep or poultry. If these rates could be cut in two, a great revival of business in these lines of stock would result.

The freight rates in car lots and less than car lots on pure-bred stock are quite reasonable, but the express rates on the smaller stuff is simply prohibitive; the result of this is a great loss to the live stock interests of the country.

Any action by this convention that would result in a material reduction in express rates would greatly increase interprovincial trade. More rapid transit with better connection is absolutely essential in the handling of pure-bred stock by freight, especially on long hauls, both from a humanitarian and money view-point.

In conclusion let me say that the receipts of our farmers might be increased to the extent of hundreds of thousands of dollars annually by the careful selection and persistent use of the very best sires available. The gospel of improved stock cannot be preached too earnestly. Not a province in the Dominion but would benefit

immensely by an active campaign of education setting forth the great benefits to be obtained by the improvement of our studs, flocks and herds. We have not half good enough pure-bred stock in the country and we have far too many scrub purebreds. The truthfulness of the first statement will be admitted by every one and the truthfulness of the latter statement will be apparent to any one who has spent some time among the pure-bred herds of the country. A liberal application of the knife and the relegating of quite a percentage of the female to the grade ranks would be for the ultimate good of the industry. If our breeders, one and all, would be satisfied only, with a high standard of excellence, the superiority of good breeding would soon become so apparent that the services of the pure-bred live stock evangelist could soon be dispensed with. Adjust conditions so as to get the basis of the business, the commercial live stock industry, in as flourishing a state as the laws of supply and demand will allow and the interprovincial trade will take care of itself. Let me emphasize once more that if the breeders of eastern Canada are to hold the custom of western Canada in pure-bred stock, they will require to get a very noticeable move on.

THE PRESENT CONDITION OF THE LIVE STOCK INDUSTRY IN MANITOBA.

Miss E. Cora Hind, Agricultural Editor, Winnipeg 'Free Press,' Winnipeg, Manitoba.

I wish to thank you for the honour done me in asking me to speak on this subject; and if my paper seems in any measure to overlap that of previous speakers, I trust that you will bear with me.

The conditions of the live stock industry in Manitoba to some extent include the whole west, as, up to the present time, Winnipeg has been the largest sorting and distributing market, and the point at which all stock intended for export has been concentrated. To a very large extent Winnipeg has made live stock prices for the entire west.

The cattle industry in the west is passing through a transition period. As has been more than once stated, the day of the large ranch is nearly a thing of the past. There are still a few ranches in Alberta that are running from 25,000 to 30,000 head, and though these seem large numbers, they are relatively small compared with the number which the same ranches carried, even three years ago. I note that the *Statistical Monthly* places the cattle of Alberta, other than milch cows, at 956,000; but, in conference with some of the largest ranchers, within the last month, I am assured that their own rounding up of the cattle leads them to believe that there are not more than 600,000 or 700,000 head at the most. The calf crop of 1910 was small, and the calf crop of 1911 was also light, owing to the heavy shipments of young heifers during the latter part of 1910, when there was a keen market in the east for feeders and stockers. The west, paradoxical as it may seem, is to-day actually short of cattle in the range country; so much so indeed that more than one ranch is considering the advisability of bringing in Mexican cows, which was done some years ago, and the cows being crossed with high-class, pure-bred bulls, in time gave excellent results. The ranch cattle were the source from which export shipments were drawn. The export of western Canada has declined for the past three years, steadily. The maximum was reached in 1908, when 90,000 head were shipped to Great Britain; in 1909 the number dropped to 72,000; in 1910, to 48,500; in 1911, to 10,300. It is fairly safe to assume that, while there will probably be an increase in export shipment from time to time over that of 1911, the export trade will never again reach the proportion which it has done in the past. Every evidence goes to show that it is impossible for Canadian cattle on the hoof to compete successfully with Argentina chilled beef in the British market. There are probably many men present who are more fully advised

on the details of this competition that I am, but I am informed by several western exporters that the outlook in Britain is so discouraging that, for a time at least, they will withdraw their agencies from the old country.

THE HOME MARKET.

The fact that our export trade is diminishing is, however, no reason why the west should not increase its number of cattle. The cattle of the future will be largely raised on grain or possibly smaller stock farms, and it will take many years of breeding this way to overstock the home market, or supply the need for feeding stock, which is on the increase in Ontario. In addition to this, the province of Alberta particularly has a steadily growing market in British Columbia and the Yukon. During the year 1911 almost 25,000 head of cattle were shipped from Alberta to British Columbia and the Yukon. Thousands of head of these cattle came off the Canadian Pacific railway, Calgary and Edmonton section, where mixed farming is carried on to perhaps a greater extent than in any other portion of Alberta or Saskatchewan. The Winnipeg market for butcher cattle has consumed, in the past five years on an average, about 65,000 head, and during the past year over half a million pounds of dressed beef had to be brought in from Ontario to meet the demands of the market. The whole domestic market of the west, which has for its centres Winnipeg, Regina and Calgary, is a constantly growing one, and has never yet been adequately supplied with finished cattle or with choice, well fed veal. In 1910, the Canadian west supplied to eastern Canada, mainly Ontario, 32,000 head of feeders and 40,000 head of butcher cattle. In 1911, the shipments of feeders to the east dropped to 5,400; and butcher cattle to 16,875. This was not occasioned by a lack of demand from the east, but by the actual lack of cattle, particularly butcher cattle suitable to the requirements of the eastern market. The lack of finish to western butchers' cattle is indicated by the fact that, while the average weight of the cattle for the year was considerably in excess of that of 1910, the dressing-out weight showed an improvement of only ¾-pound. While the average price of butchers' cattle at Winnipeg for 1911 was $4.96¼ per cwt., the price in March, April and June, when the winter-fed stock is principally marketed, ran as high as $5.91—the highest price in butchers' cattle in five years. The advance in the average price for the year has been from $3.91½ in 1907 to $4.96¼ in 1911. And while the average dressing-out weight for the whole five years was only 55¼ per cent, the dressing-out weight of the winter-fed stock was 58¼ per cent.

These things all go to show that there is an ample and growing market for all the cattle which the west can raise. That there is no difficulty in winter feeding in Manitoba, even in the open, has been demonstrated over and over again. Men such as Mr. George Hamilton, of Neepawa, Mr. Lawrence and Mr. Cook, of Newdale, have been feeding bunches of steers either in open sheds or in bluffs, for years; and their stock invariably commands the top of the market and something more. Last week Mr. George Hamilton put on the market at Winnipeg a bunch of steers of some 60 head, which he had fed as indicated in the following paragraphs.

These steers had been selected by Mr. Hamilton, in September last, and run on good pasture until October 25, when they were started on feed. They weighed on an average 950 pounds. There were nine yearlings in the bunch; the balance were two year olds. They were fed in rough shed of ship lap, the south side of the shed being open. The ration was bran, barley chop, oat sheaves, and wheat straw, as much water as they wished to drink and all the salt they wanted.

They were started at 2 pounds of bran and 6 pounds of barley chop and gradually increased until, at the time of sale, they were getting 12 pounds of meal and bran a day. They had two oat sheaves a day, one in the morning and one at noon, and at night all the straw they wanted to eat, and were always well bedded.

The cost of the steers was $4.15 per cwt., or	$2,365 50
Interest on this money for the period	47 00
Total cost of feed and wages of help amounted to $10 per head	960 00
	$3,362 50
Weighed out on February 9 at 68,425, and sold at $6.50 per cwt., or a total	$4,447 62
The gain was a little over 190 pounds per steer, and the gain in price $2.35 per pound, allowing for freight, a profit remains of $17 per head.	

It has now been fully demonstrated that alfalfa can be grown with ease in all of the three prairie provinces, and that it is perfectly safe to reckon on two cuttings a year, with an average of three tons to the acre. Manitoba, last year, produced nearly 9,000 acres of fodder corn, with an average of between 7 and 8 tons to the acre of dry fodder. And, owing to the coolness, it was not an especially favourable year. Manitoba went further, however, in corn production, and I have with me to-day a bunch of ears of corn, matured in perhaps one of the most unfavourable seasons for corn production that it would have been possible to conceive. The Manitoba *Free Press* has taken a great interest in this matter of corn, and, a few years ago, secured a quantity of seed of what is known at Patterson corn, and distributed it. The only thing that they asked of the people growing it was to send them in six ears of corn and an account of the date at which they planted it, and at which it was matured. I have in my office at Winnipeg about fifty samples of corn sent in. The ears here to-day are an average of those samples. As nearly as possible the yield has been from 20 to 25 bushels to the acre, and you can see for yourselves the quality of the corn.

Oat sheaves, which are regarded by western feeders as worth quite as much as timothy for feeding stock, and even better for milch cows, can be raised with the greatest ease, and yield from three to four tons to the acre. Of course, the abundance of coarse grains and small wheat for making into meal is too well authenticated to require more than passing mention. The west, however, has been doing well in root growing, and has enormously increased its acreage in roots during the past year, though the acreage for the three provinces at present is a little under 30,000 acres. Yet even on this small area the crop produced was valued at very nearly $3,000,000.

So much for the possibilities of growing feed for finishing our butchers' cattle. Without wishing to touch on any matter which might have a political significance, I would like to mention that, when I was in Chicago in December of 1910—a period when the discussion of reciprocity was active—I had the opportunity of meeting with a number of the largest feeders for the Chicago market. They were particularly keen on getting Canadian steers, and I asked them why they preferred them to those of the Western States—Montana, Nebraska and Texas. They agreed in stating that the steer from the Canadian west was so healthy, so large, and responded so readily to feeding, that he was the most profitable steer they could handle. If our steers are the most profitable our American cousins can procure for finishing purposes, they should be equally profitable for us.

HOGS.

The total receipts of hogs on the Winnipeg market for the year 1911 was 85,000. In 1908 the receipts were 145,000; in 1909, 128,000; in 1910, 91,000—showing that there has been a steady decline in the number of hogs being raised. Of the 85,000 sold in 1911, 5,276 came from eastern Canada. Winnipeg has a total packing capacity of 450,000 hogs yearly, or a total daily packing capacity of 1,500; and an average of 266 hogs only were received. Out of these there had to be taken a certain percentage

for fresh pork. That our packing capacity is by no means too large for the requirements of the trade is indicated by the fact that during the year there were imported into Winnipeg for distribution in that city and western points 6,074,157 pounds of hams and bacon; 1,098,507 pounds of lard; and over 500,000 pounds of dressed pork, fresh. Of the hams and bacon a little over 2,000,000 pounds came from Ontario, and the balance came from the United States, and paid duty. There was also a large percentage of the lard brought in from the United States. As there are various grades of ham and bacon, it has been impossible to work out the exact value, but I am informed by the dealers that 15 cents would be a very conservative estimate of the price of this meat brought in; and the lard, 9 cents per pound. This would give an outlay for bacon, hams and lard, which certainly might have been produced in the west, of $1,009,989.

The average price of hogs on foot in Winnipeg for the past five years has been excellent. In 1907, it was $6.79; in 1908, $5.69; in 1909, $7.33; in 1910, $9.07; in 1911, $7.71. The Canadian west has enjoyed excellent health for its hogs; and there is no difficulty in raising barley, which is the best staple for hog feeding, though a mixture of all coarse grains is perhaps cheaper and more satisfactory. Alfalfa will also play a part in the hog-raising of the future. With these figures it is hardly necessary to remark that there is small danger of over production of hogs in the Canadian west for many years.

That western farmers are willing to raise hogs, if it can be done without too great an expenditure of time and money, there is good evidence. During the past autumn I published in the *Free Press* a description of the hog mills which are in use to some extent on the American side, and by which the hog grinds his own food. In a comparatively short time I had fully seventy-five inquiries as to where these mills could be obtained.

SHEEP.

There were sold on the Winnipeg market during 1911, 43,614 sheep; and of these over 17,000 came in from South St. Paul and Montana. The Canadian west, at three of its ports of entry—Emerson, Gretna, and Morse, Alberta, received altogether 33,498 American sheep for slaughter during 1911. In addition to the sheep brought in on the hoof, there was just about a million pounds of dressed mutton received from Prince Edward Island, Ontario, and considerable from the United States. As the average weight of the sheep for the year was 96 pounds, this would mean an additional 1,000 sheep, making the receipts of sheep from eastern Canada and the United States for our market 34,500 head.

There has been much said in the past of the difficulty of raising sheep, owing to the attacks of wolves; but this is no longer an excuse for not raising them. A corral that will hold a flock of from one to two hundred can readily be constructed of Page wire fencing, two widths of fencing with the top width turned outward. This absolutely precludes the possibility of wolves getting in; and there are a number of wheat farmers, both in Manitoba and Saskatchewan, who are now running flocks of from 100 to 300 on their farms, letting them eat down the summer fallow in the early summer, before it is ploughed, and turning them on the stubble as soon as the first grain is cut. In the intervals they usually have them herded—a matter of small cost where a lad in his 'teens or an old man can easily look after them, if he has a pony. There is in Winnipeg a specially active and growing market for lambs for the Christmas trade; and Mr. Thomas Forks, of Pipestone, and Mr. H. L. Emert, of Oak Bluff, Manitoba, for Christmas, 1911, brought in bunches of lambs, practically right off the stubble, which averaged 85 pounds apiece, and sold for $6 each. Both of these men declared themselves satisfied with the profit. The average price of a sheep on the hoof at Winnipeg for 1911 was just about $5, so that the 34,500 head brought in from outside points represents $165,440 which should have gone into the pockets of the Manitoba farmers.

HORSES.

The horse bill for the Canadian west for 1911 through Winnipeg was a little over $7,000,000, and the bulk of this money went to Ontario, though there was between four and five thousand head of hack horses brought in from the United States. These figures, of course, take no account of horses brought in with settlers' effects. Though this bill looks enormous, it is an improvement on that of 1910, when the west spent over $10,000,000 for horses. There has been a good deal of conjecture that the decline in the number of horses from 33,000 head in 1910 to 26,000 head in 1911 was due to the increased number of agricultural tractors used, the horse-power of the agricultural tractors sold being roughly 10,000. While there is no doubt that the sale of agricultural tractors has meant their replacing horses on some farms, the difference between the numbers of 1910 and 1911 is not wholly accounted for in that way. The difference was considerably made up by the number of western horses for sale. 1911 brought on the market practically the first large crop of heavy horses which the west has produced. Manitoba shipped many hundreds of head west to Saskatchewan and Alberta, the district of Brandon alone accounting for 1,200 horses. There are now a sufficient number of horses for sale in southern Saskatchewan to warrant a series of co-operative horse sales, the first of which was held during the last week of January, when geldings and mares, sold individually, ran from $225 to $300 each, and teams from $450 to $550. It is estimated that the increased size of farms has raised the average of the number of horses carried by the individual farmer within the past five years from 4 to 8. Of the 357,000,000 acres of arable land in the Canadian west, up to the present time less than 30,000,000 acres have been brought under cultivation, so that there is small danger of the horse market being overstocked for many years to come. Some idea of the profit in raising horses may be gathered from these figures, furnished to me by one of the horse ranches, and that by no means one of the largest. Six years ago this company took an inventory of their horses, and made up the value to $45,000. To-day their books show that the natural increase of these horses has brought the value of their present stock on the ranch up to $75,000. The number of pure-bred stallions of heavy breeds is now roughly 1,000 for the three provinces, and nearly one-half of these are in Manitoba, which is at present our largest horse-breeding province, though Saskatchewan is running a very close second.

The foregoing is roughly an outline of the present conditions of the live stock industry in Manitoba, and, to some extent, the whole west. The figures show that we have paid out a very large amount of money, namely, over $8,000,000 for foodstuffs and horse-power, that it would seem to many we might have produced ourselves. It is rather a fad of those who are enthusiasts in live stock raising, to berate soundly the western farmers for not having gone more fully into stock-raising; and on this subject the western farmer is very much in the position of the woman with the large family, who, being left a widow, was asked by her rector if she had received any advice as to what she should do for the future, and who replied tartly that she had had so much advice that, if it had been greens, she could have stocked a shop. There is no doubt that the west has not raised as much stock as it should have done, but the critics should bear in mind that, like all new countries that are easily accessible for agriculture, the west has received a very large number of immigrants who have never farmed in their lives before. The richness of the soil has enabled these people, with very indifferent farming, to raise crops, frequently, enormously profitable crops; but they have no knowledge of stock-raising, and some of those who have gone into it failed on that account. Again it is natural in any new country to follow the line of least resistence. It has been easier to grow wheat than to raise stock, and sometimes it is easier to grow flax than wheat. During the year 1911, one farmer in Saskatchewan was able to ship from his own station 85,000 bushels of flax for which he received at that station $2 per bushel. This was a first crop on land broken and disked during the August and September of 1910. The flax gave the enormous average yield of 26

bushels to the acre, and when all due allowances had been made for the cost of the land, cultivation, harvesting, &c., he had a clear profit of over $1 per bushel. Perhaps one of the most difficult things to fight in the matter of live stock production, is the example of the men who have sufficient capital to farm in a very large way. The smaller man sees what they are able to do, and he is naturally attracted to the spectacular side of farming, and the big man is too often fond of jollying the smaller farmer for want of enterprise. Western farmers are not fools, though in common with the rest of the world, they occasionally do foolish things. I am not sure but that their eastern brethren who now so frequently sit in judgment upon them would do precisely what they have done in the same circumstances. Speaking personally, I am perfectly sure, that I would be strongly tempted to do it myself.

The western farmers, are, however, awakening to the need of stock, and slowly, perhaps, but surely, they are going into stock-raising. In the past it is quite true that it frequently paid them better to sell coarse grain than to feed it—that is, the immediate money return was larger. Now, however, they are beginning to realize that a return to the soil of some of its fertility is necessary; and thus it is wiser to feed the coarse grain to cattle, sheep and swine, and ship beef, than it is to sell the coarse grain direct. There is a practically unlimited market for all kinds of live stock in the west. There is no limit to the quality and quantity of feed that can be produced. Our immigrants from Europe, particularly the Galicians and the Icelanders and Swedes, are proving themselves admirable stockmen. Every year on the Winnipeg stock yards we see more and more of these people coming in with mixed carloads. Everything possible should be done to encourage the breeding, feeding and finishing of cattle, sheep and swine, and perhaps no organization has a better opportunity of doing this than the live stock associations. But whatever agency is employed to bring this matter to the attention of the western farmer, it must always be borne in mind that in any country where a man can raise either wheat or flax as easily as in the prairie provinces, and while there is still so much new land to be occupied, the raising of live stock will of necessity have to be encouraged by every possible means, in order to induce men to go into it.

Col. McCrae.—I beg to move that the special thanks of this convention be given to Miss Hind for the very excellent paper we have just heard, the best I have ever heard before a convention.

Mr. S. Smith, Dewdney, B.C.—I have very much pleasure in seconding that motion.

The Chairman.—It has duly been moved and seconded that we record a hearty vote of thanks to Miss Cora Hind for the paper she has given us at this time. (Carried with applause.)

I desire to convey to you, Miss Hind, the sense of this meeting. We think you have shown very good wisdom in coming here to address us at this time.

Miss Hind.—I am very much obliged for the exceedingly kind way in which you have received me. I feel not altogether a stranger among you.

Mr. A. B. Potter, Longbank, Man.—The subject of interprovincial trade was brought up, and I think we should consider the express rates on small animals. We had an experience last summer in sending out a few animals and the express rates were $20.05. This is a live question in the west, both freight rates and express rates, and I hope the Railway Commission will deal with that. To my mind it is one of the most important things with regard to interprovincial trade.

Col. McCrae.—I think this gentleman ought to patronize the association cars rather than the express companies. If we want to do anything, it is to get better terms for our association cars. We arrange to have them sent out at certain definite

times and the breeders should patronize these cars. The companies have increased the rates by charging half rates for the men coming back and something ought to be done to endeavour to get that taken off. You can get better accommodation in the association cars than you can from the express companies.

PRESENT CONDITIONS OF THE LIVE STOCK INDUSTRY IN ALBERTA.

W. F. Stevens, Live Stock Commissioner, Edmonton, Alberta.

As the conditions affecting live stock in Alberta are different for each class, I shall deal with them separately, following the usual order of horses, cattle, sheep and swine.

HORSES.

During the past twenty years there has been a complete revolution in the horse industry of Alberta. A score of years ago, Alberta had horses to burn. Everything was favourable to production, but for the want of a profitable market, the business languished. The first event worth noting in the chain of circumstances which revolutionized the business, was the rush for the Yukon. This created a demand for a large number of pack horses, which at that time were obtainable for $5 each or $50 a dozen. It stimulated also the trade in saddle horses and animals suitable for freighting and cartage purposes.

Many of the adventurers who started for the gold fields were unable to endure the hardships of the far north, and turned back. On their journey southward they took time to note the agricultural possibilities of the country through which they were passing and a considerable number decided to remain and engage in farming, and in so doing, they created a demand for horses suitable for agricultural work. Co-incident with these events there began the tide of immigration from Europe, the eastern provinces and the United States which, by the close of the last century, had more than doubled the value of farm horses. Then followed the Boer war, which stripped the country of its surplus animals suitable for saddle purposes. With each new demand prices rose and the horse ranchers of Alberta looked into the future with a feeling of confidence they had not known for years. Their ranges were still intact, the ever increasing tide of immigration to the north assured a permanent market and their chief concern was how to derive the greatest possible benefit from it.

Their good fortune was, however, destined to be short lived, for almost co-incident with the close of the Boer war, it became known that winter wheat could be successfully grown in the southern portion of the province. This event sounded the death knell of horse-raising in Alberta as a ranching proposition on a large scale.

As early as 1905, females began coming to market in large numbers, showing that many ranchers were either tempted by the fancy prices offering or were forced by the rapidly increasing mileage of barbed wire fences, to sacrifice their breeding stock. Then immature animals and even foals began to be in evidence. Every such shipment proclaimed the fact that pastures were being converted into grain fields.

Although the records of shipments showed more animals going to market each year over the preceding one, the fact that so large a percentage were females and immature animals was a sufficient warning that the time must come when there would be an abrupt falling off in Alberta shipments and importations would begin. The records of shipments since 1905 are as follows:—

1905	9,310	head.
1906	13,302	"
1907	11,924	"
1908	14,419	"
1909	22,752	"
1910	27,887	"
First ten months of 1911	13,113	"

The total for the year 1911 may safely be reckoned at 16,000 head, or nearly 12,000 head less than was shipped the year before.

Railway construction and municipal improvement, which in 1905 began to assume large proportions and have steadily increased since then, drew heavily on our stock of draft horses, and by 1908 it became evident that the local supply of this class would soon be exhausted and that prices would mount to higher levels than had yet been known. In self-protection, contractors began importing draft horses from Ontario and mules from the United States.

The importation of mules was especially large during 1909 and 1910, and while I have not the figures showing the exact number, they may be fairly estimated to be about 2,500 teams. There are many evidences that large importations of draft animals will continue for many years. The farmers of the older settled districts in Central Alberta are beginning to have horses to sell, but the number is far below the demand. Prices are on an importing basis and are consequently high. A team of 1,300 pound horses, sound in wind and limb finds ready sale at $600, and I have known instances in which $650 has been paid, and heavier animals command a premium of from $30 to $50 for every one hundred pounds in excess of this weight.

Importations are no longer confined to draft horses, but eleven and twelve hundred pound animals are now being brought in. To my own knowledge, there are at the present time, several Alberta buyers in the States of Montana, Idaho and Washington looking for horses suitable for farm work.

This condition is placing a heavy charge on our agricultural development and is greatly retarding it. It accounts for the enormous increase in the number of tractors now in use on the prairie and it compels men of limited means in the bush country to use oxen or quit. Naturally, this condition will in time right itself; the question at the present, is by what means can this process be hastened.

A great deal of educational work has been, and is being done, by the Provincial Department of Agriculture, through its institute meetings and short-course schools, to induce farmers to raise more and better horses. Our farmers are to-day better judges of horses than they were five years ago, and are more exacting in their demands of what a stallion must be that they will consent to breed to. The results are noticeable in the improved class of foals being exhibited at our country fairs, but with the settler on the frontier it is still largely a matter of 'Hobson's choice.'

Considered from the standpoint of climate, water, feed and markets, there is every inducement for the farmers of Alberta to embark more largely in the growing of work horses and of mules. For those who understand it, the former may be made as profitable in Alberta as they now are in Ontario and Manitoba, and the latter as remunerative as they ever were in Kentucky or Missouri. These are the facts that the superintendent of fairs and institutes is trying to impress upon our farmers.

But we have a class who do not need this fact to be brought home to them in order to induce them to embark in the business. They are the man of the past generation who, like Othello, find their occupation gone. They are too young to quit and too old to learn a new trade. They are the ranchers whose ranches have been homesteaded and put under fence. The question is, to what extent would encouragement to this class promote the general welfare? There are in Alberta, in the north as well as the south, small areas of doubtful value as farm lands. My idea is to grant closed leases of these lands in tracts not exceeding ten sections to any one individual, for

a term of years sufficiently long to induce him to stock it, and provide such buildings, fences and watering places as will enable him to live in comfort and conduct his business economically, and at the expiration of his lease, permit him to purchase, not to exceed two sections of his lease-hold, at a price stipulated in his lease. I know, personally, of townships which would be much better off if they were occupied by four or five prosperous ranchers than they now are with a dozen or twenty homesteaders struggling against starvation, and the province as a whole would be benefited if settlers were directed to lands well suited to agriculture, of which there are still hundreds of thousands of acres available, and these rough, sandy and stony areas devoted to grazing purposes.

CATTLE.

In the raising of beef cattle, Alberta is now rapidly approaching that low ebb in production which, so far as I can learn, has characterized every country that has changed from the ranching to the farming system. Even in the farming and dairying districts, those who were growing beef cattle ten years ago did so more after the methods of the rancher than after those of the farmer. They either had large tracts of land of their own not yet brought under cultivation, or there were unoccupied tracts adjoining their homesteads which provided them with pasturage at little cost in money or attention. The straw which would otherwise have been burned, was used as a substitute for the rancher's winter range, and the result was that a matured steer had practically no cash and but little labour charged up against him. But as these lands gradually came under cultivation, each man found that the pastures on which his animals were grazing had a cash rental value for grain growing, and it was then that he realized that he could not afford to raise steers and sell them at the prices which prevailed, while our markets were on an exporting basis. It was then that he went out of the business and turned his attention to other lines of agricultural effort.

That the process of reducing herds was gradually going on among the farmers of the north as well as the ranchers of the south could be easily seen from the number of females and calves which were each year being sacrificed in all parts of the province. Although the yearly returns showed no reduction in the number of animals going to market, as in the case of horses, the class of animals marketed told plainly that sooner or later the evil day must come. As in the case of horses that evil day came in 1911, during the first ten months of which only 46,074 head of cattle were reported by the provincial brand inspectors as against 184,229 for the year previous, and during the last half of May and the first half of June, fat cattle and dressed beef were actually imported from the east.

The sudden rise in prices incident to this condition, as well as the unsatisfactory returns from grain farming during the past two years, is causing our farmers to turn their attention again to beef production. Tempted by the higher price of cattle and discouraged with grain farming because of the high price of labour and of horses, many are seeding down their farms to the cultivated grasses. This fact is eloquently told by the returns from Alberta, which show that in 1911 there were 165,000 acres of land seeded down to hay and clover as against 65,000 for the year previous. I may add that during the past year I have received more requests from farmers for information regarding the cultivated grasses best suited for both hay and pasture, than I have received during any year since undertaking to perform the duties of Live Stock Commissioner for the province. These areas seeded down to grasses, taken individually, are usually small, but since 'Mony littles maks a muckle,' they are sure to be reflected in the live stock returns of the future.

Besides this, the higher prices prevailing during the past two years, on beef cattle and dairy products have made it possible to utilize districts for stock-raising in which the Indian, the moose and the deer, were, a few years ago, unmolested. Small ranches are being established wherever hay and pasture are obtainable, as far as seventy-

five miles north of the Saskatchewan river, from the eastern boundary of the province to the foothills. The most serious drawback to the development of these small ranches, and I may say to the general improvement of the live stock industry in the north half of the province, is the fact that we haven't the kind of cattle especially suited to the country and to the needs of the people who are going there. When determining the class or breed of cattle a settler should buy, due consideration should be given to the use to which they are to be put, to the environment and general conditions under which they are to be kept, and to the skill of the person in whose hands they are to be put. Unfortunately, most people, when giving advice on this question, ignore the last two factors in the problem. They make the broad statement that if one is going in for beef he should have cattle of one of the special beef strains, and if he is going in for dairying he should have cattle of one of the special dairy breeds. But here we have a class of settlers who have not the means to wait for returns from beef cattle, yet they can raise a few steers at little greater cost than the hay necessary to feed them through the winter and they want steers that are worth feeding; they can't go in especially for milk, yet they have to milk enough cows to supply their daily wants and they ask for cows that are worth milking, and that kind of animal is practically non-existent in Alberta to-day. I knew them in Ontario when a boy, and in the Western States in later years, and they played an important part in the pioneering days of both countries, but the movement toward specializing in the older provinces has prevented their appearance in our newer ones.

An important fact that is too frequently overlooked is that the special dairy breeds give good returns only when in the hands of a special dairy man and in a special dairy environment; if these two be lacking, my observation has been that the returns fall below those of animals of less highly specialized breeding.

With increased attention on the part of our farmers to stock-raising and the utilizing, for grazing purposes, of areas hitherto unused, there is certain to result, within a few years, a marked increase in our output of beef cattle. How soon it will overtake consumption in Alberta, British Columbia and the Yukon I shall not undertake to predict, but this I do not hesitate to say, that it will not far exceed consumption in these three markets unless some method of exporting better than we now have, has been provided. It is impossible to raise two steers on the farms of Alberta for the price of one on the Smithfield market. A charge of $30 per head for transportation, feed and attendance, a shrinkage amounting to $10 and a loss in quality amounting to another $10, in addition to a reasonable profit to the men who engage in the export business, are burdens that the industry will not stand and the farmers of Alberta will again quit raising beef cattle the moment they are subjected to them.

SHEEP.

The sheep industry of Alberta, as a ranching proposition, is, for the want of pasture, rapidly on the decline. The areas formerly set apart for sheep leases, though among the poorest of our grazing lands, are being invaded by the homesteader and the flock masters are looking about them for other ranges. They have little to hope for on the prairies and their eyes are now turned towards the foot-hills. They say if they were permitted to take their flocks into the unoccupied mountain valleys for the summer months, they could establish winter headquarters in the foot-hills and perpetuate their business indefinitely. In company with a representative of the Department of Agriculture at Ottawa and a committee appointed by the Southern Alberta Wool Growers' Association, I examined, during the summer of 1910, the mountain valleys, beginning at the International Boundary and continuing northward to township fifteen. We avoided all districts in which there were evidences of cattle and horses being kept, and still we found areas which were estimated by the committee of wool growers to be sufficient to pasture, from June to October, 50,000 head of sheep. Speaking personally, I have no hesitancy in recommending that the requests of the

wool growers be given favourable consideration by the Department of the Interior, and that a limited number of sheep be permitted to graze in these unoccupied valleys, preference being given to small holders who combine to make up a flock sufficiently large to justify the employing of a herd-man and where winter quarters are nearest the desired summer pasture.

As a farming proposition, interest in mutton production is on the increase. Even in the districts devoted to wheat growing, the farmers are beginning to realize that sheep can profitably be made to enter into their system of agriculture. They see that it is cheaper to let a flock of sheep attend to the business of packing the soil and killing weeds, than to do it with teams, especially while the wages of a four-horse outfit is from $8 to $10 per day.

The principal detriment to a rapid expansion in sheep-raising on the farms of Alberta is the cost of building suitable fences. If some means could be devised whereby farmers could secure coyote proof fencing at a moderate price sheep-raising in Alberta would at once enter more largely into the general husbandry of the province. Providing foundation stock and pure-bred rams at low cost, does not greatly interest the man who is conscious of his inability to protect and care for a flock after he has got them.

SWINE.

To outsiders, the swine industry of Alberta is something of an enigma. They say, 'how is it that a province that produces grain suitable for swine-feeding in such large quantities as does Alberta, fails to raise enough hogs to supply its own requirements.' As the difficulties causing this condition and the remedies therefor are entirely provincial, little need be said on the subject at a convention such as this.

To one who is familiar with conditions throughout the province, two reasons stand out prominently. One is the difficulty in inducing newcomers to adapt their methods to the climatic conditions of the country. Each prides himself on the fact that he was a successful swine grower in the country from which he came and he resents any intimation that the methods which brought him success there, can do otherwise in the northwest. Each follows his own ideas despite the repeated warnings of his more experienced neighbours until his losses have practically put him out of business. When that occurs, he is ready to take up with a new idea. Generally speaking, the American keeps his brood sows so fat during the winter months, that, although they have plenty of chance to take exercise, they do not do so, and when farrowing time comes, a large percentage of their pigs are born weak and soon die. The eastern Canadian, on the other hand, thinks he must close house his hogs, and, although his brood sows may not be too fat to farrow their pigs successfully, because he has denied them sufficient exercise, he also suffers a serious loss. In addition to this, the close housing of animals during cold weather causes frost to accumulate on the interior of the buildings in cold weather, and this is followed by dampness, when the weather moderates. Dampness and cold cause rheumatism and pneumonia and the swine grower who practises close housing suffers an additional loss from these causes. It is a difficult matter to convince a newcomer to the province that there is no better method of wintering brood sows in Alberta than feeding them once a day on whole oats thrown broadcast on the ground, giving them a warm thin slop every night and morning and allowing them to bed in a pile of wheat straw from which other stock are excluded.

The other outstanding fact connected with swine-raising in Alberta is that as soon as more hogs are grown than are required for fresh meat purposes, prices are put on an export basis, and this, in spite of the fact that most of our cured meats and lard are imported from the east and from Chicago. Good business may make this necessary but our farmers refuse to see it that way. A great deal has been said and written about the recent importation by Alberta packers of some 10,000 head of dressed hogs

from Toronto at a price a fraction of a cent lower than locally dressed carcasses cost them. In defence of our farmers it is but fair to say that these eastern carcasses are mostly of classes that are subjected to a dockage of from ½ cent to 1 cent per pound live weight in Alberta.

THIRD SESSION.

Mr. ANDREW GRAHAM in the chair.

The CHAIRMAN.—I have been asked to take the chair until the president arrives. You are all aware of the subject for discussion this evening. We are fortunate in having with us to-night the chairman of the commission that inquired very closely into the subject of tuberculosis. He is, undoubtedly, the highest authority on the American continent on this subject, and I am sure we will have a very able address from Dr. Rutherford and it will be followed by an interesting discussion.

I have much pleasure in calling on Dr. J. G. Rutherford to address the meeting.

ADDRESS:—BOVINE TUBERCULOSIS.

Dr. J. G. Rutherford, C.M.G., Veterinary Director General and Live Stock Commissioner, Department of Agriculture, Ottawa, Ont.

Mr. CHAIRMAN, LADIES AND GENTLEMEN,—I feel that I owe you an apology for coming doubly unprepared. I have been so exceedingly busy that I have not been able to prepare a paper, and besides that, I have been suffering from a very severe bronchial cold which has been keeping me awake at nights. For both of these serious defalcations on my part I must most humbly apologize.

The subject before us to-night, bovine tuberculosis, is one of very great interest to all live stock men, but more particularly to owners of cattle and hogs. Horses, while by no means immune to the disease, very seldom contract it, although I have seen, as most practising veterinarians have seen, isolated cases of tuberculosis in horses, generally following the practice of bringing up a colt on cow's milk.

Sheep are practically immune to tuberculosis. It is very seldom, indeed, that the disease is found in these animals, although there are a number of cases on record.

It is, as you know, a very serious and rapidly becoming more prevalent disease of poultry. The form of tuberculosis which affects poultry is known as avian tuberculosis, and it is not nearly so transmissible to animals of other species as is bovine tuberculosis.

You will recall that when in 1882 the late Professor Robert Koch made the great discovery of the bacillus tuberculosis, it was considered for a number of years that there was practically no difference between bovine tuberculosis and human tuberculosis. Strange to say, the very man who was responsible for that opinion, Dr. Robert Koch, himself, was the individual who, at the International Congress, held in London, England, in 1901, took the opposite ground and made the claim, for which he ever afterwards strongly contended, that the form of tuberculosis affecting cattle was essentially different from the form of tuberculosis affecting human beings, and that the danger of transmitting one form to animals of the other species was almost entirely negligible.

Personally, I never could see my way clear to adopt this view of Professor Koch, and while I fully realize and speak with all due recognition of my own limitations in

the field of science as compared with those of a man of the outstanding eminence of Dr. Robert Koch, I may say that I felt all along, as a practical veterinarian, that I had very good grounds for thinking differently from what he did.

There is no class of men to whom the world at large, at the present time, owes any more than it does to the bacteriologists. We must all admit that these patient, painstaking students of science, who have devoted their lives, in many cases, and in all cases, the most patient, careful and studious attention to the practical problems of disease, and its transmission are entitled to every possible credit and appreciation that we can give them. At the same time, and I speak again with all due deference, I am just a little chary of accepting their views on every occasion or on every subject. I have an old friend, a cynical Englishman, who edited for many years one of the leading veterinary periodicals published in London, England, and I remember that a number of years ago when discussing this same subject, he said, 'It is very well, while appreciating the work of the bacteriologist, to be careful in accepting his conclusions, and, it may be laid down as a safe rule, that it is not wise to accept the verdict of a bacteriologist unless it has been verified by another bacteriologist of eminence, and preferably one of another school and another country.' For instance,' he said, 'I would like to have the findings of a German bacteriologist confirmed by a Frenchman, and I would like to have the findings of a Frenchman confirmed by a German, and I would prefer to have the findings of either of them confirmed by an Englishman. As for the findings which we receive from America, I would say, that, in all cases they should be received with respectful doubt.'

The practical man who keeps his eyes open and who drives in and out of farmers' yards and who walks in and out of farmers' stables, has perhaps as good opportunities of judging of the actual facts with regard to the transmissibility or non-transmissibility to the human species of bovine tuberculosis as has any learned gentleman, who, with one eye glued to the business end of a microscope keeps the other fixed on the star which he regards as his own scientific reputation. I saw, long before Dr. Robert Koch made his first pronouncement in 1882, many, many things, which led me, then a very young, although enterprising veterinarian, to believe that bovine tuberculosis—tuberculosis of cattle—was directly transmissible to human beings. I saw that where the dairy herd on a farm was badly affected with tuberculosis, the chances were very strongly in favour of the family on that farm, particularly if such a family was composed of young people, being also very badly affected with tuberculosis. I had a good deal of experience when I was a young man with bovine tuberculosis. Among other experiences I lived for a time on a farm which many of you know, the 'Bow Park farm,' which was a great distributing centre for the fashionable Shorthorn cattle of thirty or forty years ago. It was also a distributing centre for the whole of western Ontario of bovine tuberculosis. It spread that disease all over the western peninsula, and it sent it to many other parts of the continent where the cattle from Bow Park farm went.

I was never able to agree with Dr. Robert Koch's contention that human and bovine tuberculosis were altogether dissimilar and not transmissible from one species to the other. I had to admit that my authority, from a scientific point of view and from a world point of view, was not nearly as good or as worthy of repect as that of Robert Koch, but I kept my opinion just the same, and, as time has gone on, it is very gratifying in one sense to know, although in another sense I would very much rather have known I was wrong, that the scientific world has come around to my view and has entirely abandoned the view of Professor Koch. In other words, there is not to-day, so far as I know, a medical scientist of any standing who is not convinced not only that bovine tuberculosis and human tuberculosis are one and the same disease, but that there is—mark, I am going to be very careful in the word—very good ground for the belief that bovine tuberculosis is the motherlode, the original form of all tuberculosis, and that if there had been no bovine tuberculosis there would never have been any human, any porcine or avian tuberculosis.

While it is very difficult, indeed, to transmit human tuberculosis from the human being to an animal of any other species, and it is very difficult to transmit tuberculosis of hogs to any animals but hogs, it is, on the other hand, quite easy and a matter of every day occurrence for bovine tuberculosis to be transmitted to animals of almost every known species.

Now, it is true that there is what is known as a morphological difference between the bacillus found in human tuberculosis and the bacillus found in bovine tuberculosis just as there is a morphological difference in the bacillus of avian tuberculosis as compared with the bovine bacillus and the bacillus of human tuberculosis. Statistics show that up to sixteen years of age a very large percentage of cases of human tuberculosis which are examined microscopically are infected by the bovine form of the bacillus; that after sixteen years of age in human beings the number of cases of tuberculosis, in which the bovine bacillus prevails, becomes constantly smaller, and the number of cases in which the human bacillus is recognized becomes constantly greater as age goes on. It is not well to jump at conclusions, sometimes one lands on one's feet and at other times otherwise. At first our scientific friends jumped to the conclusion that the bovine form had a special affinity for children and young people, and that they were peculiarly susceptible to its attacks, and that older people only became affected with the human form of tuberculosis and were practically immune to the bovine form. Then they discovered that an enormous percentage of human beings are tubercular, some authorities claim 80 per cent, but anyway, well over 60 per cent of all human beings in civilized countries are tubercular, that is sixty out of every hundred people at least have got the germ of tuberculosis somewhere in their systems. That has been shown by the post-mortem examinations held in hospitals throughout the world on the bodies of people who have died from every imaginable cause, who have died from accident, who have died from suicide, who have died from typhoid fever, pneumonia and other diseases. I have no doubt some of them had been in the habit of attending conventions and were talked to death. The post-mortem examination of these bodies revealed the scientific fact that people were carrying tuberculosis with them through life, while eventually dying from other diseases. The disease became encysted, as it were, locked up, and in a great many cases was comparatively harmless, although as a result of an attack of congestion of the lungs or a severe congestive chill, acute tuberculosis might develop, sometimes very rapidly.

Medical men and scientists put their heads together and then they began to realize that the great majority of these people become affected in childhood, a very large number in infancy, and carry the germs on through life from that time. You and I have often been surprised at the revelations of the post-mortem or the slaughter house in the case of cattle that no one would ever dream were affected with the disease. It was realized that the great majority of these human cases contracted the disease in infancy and contracted it from bovine sources. They contracted it from the milk of cows. It was found that the milk from the tuberculous udder was practically certain to produce tuberculosis in a child. In Denmark, they do not allow the calves to drink the milk from a re-acting cow, but such milk goes into town and is sold for consumption by the children. If we want to raise healthy calves we cannot allow them to drink milk from re-acting cows. If we want to keep our hogs healthy and free from tuberculosis we cannot allow them to take milk from re-acting cows. Our medical health officers are not so particular, and in the great majority of our communities, and especially in country districts, no precautions whatever are taken and the consequence is that little children are taking the milk from these tubercular cows right along.

I am going to show you something else that is a source of danger. It is quite true that in the milk of a great many cows which re-act, if drawn from the udders under proper precautions, it is impossible for the bacteriologist to discover any tubercle bacilli, but that milk, as it is offered usually for sale for commercial purposes

is infested with tubercle bacilli. Taken from the udder under aseptic precautions, it contains none, but taken from the udder under ordinary conditions, it becomes charged with the bacilli of the disease. How does that happen? It is one of those disgusting things that one does not want to talk about, but it is just as well to understand it. It may be that the cow has open tuberculosis, or an abscess in her lung, or in one of the glands in the chest, in the thorax; you have seen them sometimes, they are as big as your fist, sometimes as big as your two fists, sometimes they are as big as your head. You have all seen these dirty masses when you open one of these cows. These open abscesses, especially if in the lung, frequently communicate with the air passages. The cow is a very clean animal and she does not spit, but as a rule, she swallows the discharge from the abscess when it is coughed up and it goes down through the wonderfully arranged stomachs which our bovine friends possess, on through the bowels and becomes mixed with the manure and passes out in the usual way. Some of it gets on the tail and it is flicked onto the flanks and the cows lie down in it in the stable. The milker comes along and some of it is on the udder and it gets into the milk, lots of it; you know it does.

Milk affected in that way is one of the most effective agents in spreading tuberculosis, not only among human beings but among calves and pigs as well.

My friend, Dr. E. C. Schroeder, Superintendent of the United States Experimental Station at Bethesda, Maryland, who is one of the most painstaking and conscientious investigators whom it has ever been my privilege to know, tried an experiment a few years ago in the feeding of pigs with butter made from milk containing tubercle bacilli. He took four pigs and he fed three of them an ounce of butter a day. They were kept under absolutely aseptic conditions, there was no possibility of infection in any other way. He fed three of them an ounce of butter a day made from the milk of the tubercular cow; he made sure that the milk contained tubercle bacilli before he made the butter; he did not give any butter to the fourth pig. The three pigs contracted tuberculosis in a very few weeks, the fourth which pig did not get that ounce of butter did not contract the disease. That is simply an illustration of what is going on all the time. You all know there is a very strong resemblance between the internal economy of the pig and that of the human species. If three healthy hogs can become infected by daily eating one ounce of butter it does not require a philosopher to understand the very real danger which we, and especially our children, are encountering when we use as little precaution as we generally do in regard to the consumption of dairy products.

Not only is it the case that human beings are infected in childhood, when the milk diet is most common and when they are most susceptible to infection, but there is another phase of this transition, of which I told you a few moments ago, as occurring from about sixteen to twenty years of age. The tubercular bacillus is not immortal; like you and me he dies when his time comes. The morphological characteristics which, after a while, become identified with the human species are certainly acquired, because you can take the bovine species of bacillus and plant it in another animal and after a time it acquires the morphological characteristics of the bacillus of that species. You can take the human form of bacillus and plant it in the bovine, and after a number of generations it takes on the morphological characteristics of the bacillus of the bovine species. I would point out that children who should be nursing but who are taking the milk of a diseased cow instead, usually contract tuberculosis of the bowels; a little later they are apt to take post pharyngeal tuberculosis and get these lumps in the throat, which sometimes go away and sometimes have to be removed. They are very disagreeable and a great many people don't know what they really are. Then in children older still, about seven or eight or nine years of age the disease may take the form of tubercular meningitis, inflammation of the covering of the brain and spinal cord, because it is just at that age that the flow of blood is greatest through the brain, owing to the development of that organ going on

at that age. Again a great number of children become infected whose parents never suspect that they are infected. A child takes a little fever, the temperature goes up, the doctor comes in and looks very wise and gives a little quinine or something and the temperature goes down in a few days. Nobody realizes that the child has become infected with tuberculosis. After a while the symptoms pass away and the child goes along but it is a little delicate, puny child that is never strong, never healthy and never happy. The child does not know and its parents do not know that that is the time when tuberculosis became implanted in its system.

If you transplant the bovine bacillus from a cow to a child it goes on reproducing itself, but after a time it gradually changes from the bovine shape to the human shape, so that even if children are infected with the bovine type, by the time they get to be sixteen or twenty years of age the bacillus has accustomed itself to its surroundings, has taken on the morphological characteristics of the species of the animal in which it has found its habitation and it is, to all intents and purposes, the bacillus of the human kind. Scientists have recognized all these points now and, as I have already said, there is a deep and constantly growing conviction that bovine tuberculosis is the mother of all tuberculosis and that to it is traceable the disease, no matter in what species of animal it may be found.

We have in Canada a good deal of human tuberculosis; we have a good deal of bovine tuberculosis. We have, as you know, had a meat inspection service in force for the last four years. You will find on the seats a little book giving some information about the meat inspection service, which it became my duty to organize and of which I have had general supervision. We find a good deal of tuberculosis in the various abattoirs which are under supervision and control. Of course, we do not have an opportunity of seeing anything like the total number of tubercular cattle and swine that exist in the country because we do not inspect everything. Under the Dominion Act, we have only the right to maintain inspection in establishments which are engaged in export or interprovincial trade. We have no right to inspect animals slaughtered in establishments which do not engage in interprovincial or export trade. A man can kill in his own slaughter house almost anything he likes as far as we are concerned, provided he does not ship anything out of the province in which he lives. Of course, you understand that everything and anything that goes into an establishment of which we have charge, is inspected, whether it finally goes out of the province or not. The ordinary butcher is not subject to inspection, and as you all know, there are in almost every community, butchers who deliberately buy up animals of that class and slaughter them and trim out the diseased portions and offer the rest for sale, and your wife and my wife and the other man's wife go and buy it and it is taken home and eaten.

I have some figures here which are rather interesting. In the year 1908, we supervised the slaughter of 298,241 cattle. Of these 1,388 were totally condemned for tuberculosis. In 1909, we supervised the slaughter of 381,789 cattle, and of these 1,697 were totally condemned for tuberculosis. In 1910-11, we supervised the slaughter of 405,339, of which 1,492 were totally condemned on account of tuberculosis. Totally condemned for all causes in the fiscal year 1908-9, were 4,566; of these there were 2,570 slink veal calves which cannot fairly be reckoned in the count. Over 70 per cent of the cattle condemned that year were condemned for tuberculosis. The next year 69 per cent, and last year 66 per cent of all the cattle condemned were condemned for tuberculosis. Further, out of the 298,000 cattle that were slaughtered in 1908-9, in addition to the 1,388 which were totally condemned, there were 7,780 found to be effected with tuberculosis, which made 9,000 head of cattle out of that number found to be affected with tuberculosis. The figures run along for the various years in very similar proportions.

In swine, we find in 1908-09, out of 1,532,796 we condemned 3,009. The following year out of 1,260,000 we condemned 1,788. Last year out of 1,452,237, we con-

demned totally 2,523. That is a small percentage. In 1908-09, ·19; in 1910, ·14; last year, ·12. Of the total condemnation for all causes in swine in 1908-09, tuberculosis was responsible for 66 per cent; in 1909-10, 65 per cent, and in 1910-11, 72 per cent.

I have not said much as to the proportions of cattle condemned, but out of a million and a half in 1908-09, the portions of swine condemned for all causes was 199,149, of these 175,483 were for tuberculosis. In other words, over 88 per cent. The following year, out of 1,260,000 hogs, 227,966 portions were condemned, and of these 206,442, or 90·58 per cent were condemned for tuberculosis. Last year, out of 1,449,000, there were 318,705 portions condemned, and of these 295,925 were condemned for tuberculosis, or 92 per cent.

I am not going to take up your time reading figures, but it is easy for you to see that there is a tremendous loss. This is only a small part of the business of this kind which is done in Canada, and with that percentage due to this one disease it can readily be seen it is a cause of great financial loss to say nothing of the constant and ever present danger of spreading infection among human beings. Sometimes I get three and four letters in a day from people throughout the Dominion of Canada telling me that they have reason to believe that their cattle are affected with tuberculosis and asking me to take immediate action. I can only write and explain that we are not taking action at present in that particular way. I tell them what we are willing to do, but we have not yet undertaken to stamp out bovine tuberculosis in Canada. Many people wonder why it is that we do not do more in this direction. Tuberculosis is a matter which must be considered very carefully before undertaking to deal with it. One of the difficulties of Federal administration is that you cannot have one sauce for the goose and another for the gander; you must treat everybody alike, and if you are going to send inspectors and pay compensation to John Brown, you also have to send inspectors and pay compensation to Peter McDonald. It does not matter whether they live in Prince Edward Island, Nova Scotia, Manitoba or British Columbia, you must treat them all alike. When I came to Ottawa, the law said that if a man sold a tubercular animal he was liable to a fine of $200. If any man found he had tuberculosis in his herd, or suspected the existence of it, and somebody notified the department, the department was, in law, bound to take action and quarantine his premises and do a great many other things. I looked at the situation very carefully, and I said, 'If there is anything on the statute book that cannot be obeyed, it had better be removed.' One of the things I have been very careful about is to try and eliminate from all my regulations anything requiring a man to do something impossible. Our statute books are full of such laws, and some people have regulations full of restrictions and most emphatic instructions to men to do things they cannot possibly do. I felt, so long as we were not in a position to deal with this disease in an effective way, we ought to assume a sane and sound position with regard to legislation and I had a little amendment put in, and, as a consequence, a man can sell, in good faith, any animal which happens to be affected with tuberculosis without running the risk of being heavily fined or sent to jail.

We began to count the cost of a policy of slaughter and compensation. You know what we have done with glanders. It was very desirable and proper that we should stamp out glanders. It was also a very good object lesson, not only to the Canadian public, but also to the veterinarians of Canada to see that a disease could actually be handled and stamped out. We have succeeded with several other diseases in a similar way.

I felt that we should do two or three things before we ever thought of dealing with bovine tuberculosis, and one of these was to educate the public and the veterinary profession to the belief that it was possible to achieve good results by sound, sane and intelligent policy in dealing with a contagious disease. Then I thought it would not be a bad thing to train a few of these veterinary surgeons and to make inspectors

of them. The average veterinary surgeon is like other people. He thinks he knows everything and he is very often mistaken, very, very often mistaken, more or less seriously. Pick up one of these fellows and start him out with an Act of parliament in one hand and a gun in the other and a license to 'Sink, burn and destroy,' such as they gave the old privateers, and he is a more or less dangerous character. You must first teach him respect for the law he carries in his hand and his responsibility, and that he is not a law unto himself. He must be courteous and tactful and diplomatic and persuasive, and then, above all, he must have a back-bone like a bar of iron. You cannot find them like that every day. You have to look quite a while before you get one of that sort ready made. Even after you have put a few years work on him he is not always finished. We have been making these chaps right along for the last ten years, and we have got quite a little regiment of them now. Some are in the ranks and some are out of the ranks, some of them have gone back into private practice, and some have been promoted into higher positions, but they are all available in the country and they would form a nucleus for the tremendous army of officials who would be required if this department ever undertook to handle bovine tuberculosis on the lines on which glanders and hog cholera and some of the other diseases have been dealt with.

There are about seven million cattle in Canada. In the State of Minnesota there are something like three million cattle, and that state is one of the few which have attempted to handle bovine tuberculosis in an effective way. It has not done it. No community anywhere in the world has ever succeeded in handling bovine tuberculosis effectively. We have had some of the costliest legislation on bovine tuberculosis in different parts of the world, that it is possible for the mind of man to conceive, but none of these communities which have passed that kind of legislation have ever succeeded in getting anywhere with it. They have all had to repeal the legislation. A few communities have attempted sane legislation, and of these Minnesota is one, New York State is another, Wisconsin is a third. Minnesota has practically dropped her campaign, New York is doing a good deal of work, but it is only a matter of time before she will have to abandon her present attitude in regard to the disease.

The Minnesota people made a very careful calculation of what it was going to cost to stamp out bovine tuberculosis and eradicate it thoroughly in seven years, and the figures were, for the first year, $7,553,650; for the second year, $14,703,540. For the seven years it was going to take to complete the work $35,004,260. Now the total value of all Minnesota's cattle in 1908, was $37,197,198. The present value is about $50,000,000. It was going to cost $35,000,000 to stamp out tuberculosis according to the most careful estimate they were able to make. So you see it is not altogther a problem for the school boy; it is a very serious business.

I was a couple of years ago, by a peculiar set of circumstances, over which I had no control, placed in the position of President of the American Medical Veterinary Association, which is the largest body of the kind in the world and the most aggressive. For a number of years there has been in that body more or less discussion of the problem of bovine tuberculosis. Now, I happened to know that my probable successor as president was going to be Dr. A. D. Melvin, Chief of the Bureau of Animal Industry in the United States, and a very progressive and effective man. I had been studying the problem of tuberculosis even before I came into the service of the government. My old friends will remember the time when we used to talk about it out west, twenty years ago. I felt the opportunity was too good to be lost; I knew, regardless of who the man might be, how clever he might be, or what official standing he might have on this continent or elsewhere, that if any one man got up and propounded a policy in regard to the control and eradication of bovine tuberculosis, he would have more critics than supporters, and that a very large proportion of the veterinarian and medical authorities on the continent would start after his scalp and would pound his

policy until he would not know it. I knew the live stock men and the health authorities and medical scientists would all be taking a crack at it, and I thought the occasion was a very auspicious one and I started to work and succeeded in getting the American Medical Veterinary Association to appoint an International Commission on the control of bovine tuberculosis. I happened to be the head of the veterinary sanitary service of the Dominion, and being succeeded in office by the head of the veterinary sanitary service of the United States, I thought it would be a good excuse to get the Departments of Agriculture of both countries to lend their support and countenance to the scheme and to help us with the financial end of it and make it possible for us to propound a policy which would, to a certain extent, be a joint effort. By the careful and judicious selection of the members of the commission, it might also be possible to include among them a considerable proportion of those who might afterwards be dangerous as critics, if they were not criticizing themselves. If you will look at the list of the names of the men who form that commission, I think you will agree with me, that there are comparatively few men in America, either in or out of the veterinary profession, who would venture to get up and criticize the policy which has their endorsation and support.

It would not be fair to take up your time explaining the various things which are in that report, you have all got a copy. I have only this to say,—that there is in it something that I would like to read because it has an important bearing on the whole thing. It is at page 13, 'The best law ever framed can be made an utter failure by stupid or injudicious administration, while, on the other hand, the most drastic legislation can be rendered acceptable if enforced with reasonable tact and diplomacy. Provided, therefore, that these qualities combined with integrity, thoroughness and determination, are available for administrative purposes, the members of the commission are convinced that the enforcement of a law based on their recommendations, will prove to be by far the most powerful and effective, educational agency which could possibly be employed.' My reason for reading you this is that we have been for ten years educating the Canadian stock-owning public, so far as regards veterinary sanitation on what, to the best of our judgment, we have considered to be sane and sound lines. We have not made any startling announcements during the last ten years. We have not told you any fairy tales and we have not compelled you to listen to any ghost stories. We have worked steadily and faithfully and honestly to overcome the various animal plagues which have been affecting your stock, and it is a great source of satisfaction to me to realize that our efforts have been appreciated in a most extraordinary and gratifying way. We feel that it is a great compliment; we know that we are a source of irritation to the stock-raising public: we know that we stop trains and steamships and walk onto a man's farm and kill his horses and his hogs and insist on dipping his sheep or his cattle when he is quite sure they do not require it. We quarantine his premises, interfere with his sales and generally treat him in a most unfriendly way, and when we realize that we have been doing that sort of thing for years and that you are still friendly to us and that you understand that we are doing our best and that the work is necessary, painful though it be, it is very gratifying indeed. We appreciate very highly the assistance you have given us and the loyal support, which is constantly becoming more loyal, which we receive from you. Knowing, as I do, the confidence now reposed in the work of the Health of Animals Branch, I believe that a careful, sound, conscientious policy, carried out on the lines suggested in that paragraph which I just read, would with the support of the stock-owning public of Canada, bring about in a comparatively short time the most gratifying results in the way of a reduction in the prevalence of bovine tuberculosis. If we took the attitude that tuberculosis is a disease dangerous to cattle and hogs, and if we followed them back from the slaughter house as we are now in a position to do, and found the owner and had a good long talk with him and explained the situation to him and put him under a certain amount of restraint and

arranged matters in the way of compensation and so on, we would soon get the public on our side, and once we had that it would only be a very short time until the movement would become almost voluntary, and the people would be so pleased at getting rid of the disease that they would be taking the greater part of the onus and work out of our hands. I feel satisfied of that and I know my own Canadian public well. I have driven in and out of Canadian farm yards for twenty-five years; there are some things I do not know about the Canadian farmer, because he, after all, is full of surprises, but still, there are a great many things I do know about him and I am satisfied this can be done, provided it is gone about in a right way and it won't cost thirty-five million dollars either.

I want to tell you about following these hogs back from the slaughter house, I have the figures here. I am not going to show them to you because I don't think it is fair at this stage of the game. There are certain districts in Canada where the percentage of tuberculosis among hogs is appalling. We know where the hogs come from. Every hog is killed under the eye of one of our inspectors and we find that by far the heaviest percentage of tuberculous hogs come from these districts where the hogs and the cattle run together. That is the experience in the middle west of the United States also. The next heaviest percentage is found in the co-operative dairying districts where the milk is taken to the creamery and the skim milk is taken back and fed to the hogs or to the cheese factory where the whey is taken back to the hogs and so on. There are a few districts where the milk is pasteurized and where the trouble shows a remarkable diminution. There is this difference between bovine tuberculosis of cattle and bovine tuberculosis of hogs; because it is almost always bovine tuberculosis in hogs. The disease develops very rapidly in the hog and the hog does not live long enough in this packing-house country to break down with it, and we get him before the disease has advanced so far as to render the carcass useless for food. We find that those hogs that come from districts where pasteurizing of the whey is going on are rapidly assuming a better position. Of course, there is tuberculosis among the cattle, but we do not see so much of it among the hogs. One badly diseased herd of cows in a district, where they are sending the milk to the factory, will infect the whole district unless great care is taken in the distribution of the by-products.

In the third place we find that the pure-bred herds of cattle are, in many cases, responsible for the increased percentage of tuberculosis among hogs coming from certain districts. These are all points that have to be considered.

Now, Mr. President, I think I have worn out the patience of the audience. I have not covered the subject; it would take a month to do that, and I do not suppose you want to stay here for that length of time. If there is any other information you would like to have, or if any one would like to ask any questions, I shall be only too glad to answer if I can.

The CHAIRMAN.—If there was any one in this house who was not convinced that we are up against a big problem, I should think he would be convinced after hearing the able address delivered by Dr. Rutherford. The question is before us and it has got to be dealt with. There are scores of men in this audience to-night who know that this is a very serious matter, but they would very much object to coming on this platform and giving their experience with regard to it. It is causing an immense amount of loss to the stock of our country.

A MEMBER.—Has the doctor made any arrangements to have a tuberculous animal slaughtered during the sessions of the convention?

Dr. RUTHERFORD.—I am sorry we have not made that arrangement. I did at one time think it would be a good thing. The man responsible for it not being done is Mr. Ruddick. He assured me that it was quite impossible to give us the use of this hall any longer than two days and I was compelled to forego making the necessary arrangements. Mr. Ruddick begins a fruit conference on Wednesday.

Professor DAY.—I am not sure that I have any questions to ask, but, I think, possibly, that a little of our experience might be helpful to some of those present. I am sure that no person present ever listened to a more lucid discussion of the tuberculosis problem than we have the pleasure of listening to to-night. I feel that it would be a pity if the subject were allowed to drop and not pushed a little further. During the past three years we have been following what is known as the Bang system of dealing with tuberculosis. During that time we have made about four hundred and fifty tests, some of these, of course, are re-tests of the same animals. Never in any single, solitary instance have we seen any injurious effect upon the animal tested. The more you study this question the more you find out that it is somewhat puzzling, and the more careful you are at jumping at conclusions. There are a lot of problems that come up. One of the peculiar things is the fact that some animals have remarkably resistant powers as regards this disease, and others again will contract the disease on very slight exposure. We have had some remarkable cases of that kind. The weak point of the test, as I see it, is simply this.—it does not tell you a single thing about how bad the animal is. If there is the least speck of tuberculosis in that animal it will give you just as marked a re-action and possibly a more marked re-action than one that is decidedly badly affected. And we have found that clinical symptoms are a pretty unsafe guide with regard to matters pertaining to tuberculosis.

Somebody suggested having an animal slaughtered for demonstration; you might hit it and you might not. During the last three years we have taken some forty post-mortems on animals we had tested, besides a number of post-mortems on animals we had not tested, and we struck some rather peculiar things. I remember one cow in particular. The first time we tested her two years ago, she gave a rather doutful reading. She went up to about 103. We were making a test of the herd and we put her in with the infected bunch. The next time she gave a decided re-action. We tested every six months and I think she gave a decided re-action twice. She had a badly affected udder and finally got so that she would hardly give any milk—we would get a little bloody material from the udder. She went down in flesh and she was just the animal that most people would select for a demonstration here. In the post-mortem there was no tuberculosis in her udder; you never saw a more perfect liver and set of lungs. The only tuberculosis we could find in her at all were a few deposits in some of the glands and gullet, the most disappointing exhibition of tuberculosis I ever saw considering the nature of the cow. One peculiar thing about the test is that, in animals under a year old that re-act to the tuberculin test, we have been very unsuccessful in finding the disease in the animals at all. It may have been there, but we could not find it. Therefore, I am always sceptical regarding re-action in the case of young animals. We had one cow that passed the test four times, and the fifth time, owing to a bent needle, part of the dose was lost, and she got a second dose to make sure, and that time she did re-act. If you wanted an excellent exhibition of a tuberculous cow that is the one you should have selected, and she stood right in the stable passing the test time after time. In the great majority of cases the test will indicate the presence of tuberculosis or the absence of it, but the weak point of it all is that it does not tell you how badly affected the animal may be. We have had considerable experience in buying animals and applying the test to them. If we go out and buy a cow from a farmer who is careless about his stock, we are pretty sure to get a cow that will pass the test. The cow I am always doubtful about is the cow that comes from a herd that is closely stabled and kept under what we call the forcing system. It is stated that tuberculosis is most prevalent in pure-bred herds. I would not like to say that is absolutely correct, but I would say that I think it is most prevalent in the herds where the owner is afraid to let them outside for fear that he will hurt them. It exists in those herds where the owner is especially careful and babies the animals right from the start. You should be afraid of that kind of herd when buying a cow.

We had a little experience of our own in that respect. To my absolute knowledge there was more or less tuberculosis in the two herds on our farm as far back as twenty years ago. In one herd, eighteen or nineteen years ago the test was made and a large number of the animals re-acted, and all the re-actors were slaughtered and by the time they got through slaughtering there were not many left and the post-mortem showed that there was very little, if anything, wrong with them. Some of them, of course, were advanced cases. The trouble was that the test was not followed up and things went on as they were before. These two herds, as far as I know, have been equally exposed to the disease, and that has been going on for nearly twenty years. In one of these herds thirty-eight animals were tested and thirty-nine per cent of them re-acted. Now that is bad enough. In the other herd, thirty-five animals were tested and sixty-eight per cent of them re-acted. The herd where thirty-eight per cent re-acted was kept in a miserable kind of stable, not well lighted and not well ventilated and rather damp. It was condemned by nearly every stock man who went into it, and yet there were fewer animals re-acted in that herd than from the other stable where the ventilation was better and where the conditions were much better in every way. What was the difference? One herd was let out in the air every day for a short time and the other herd was kept in the stable throughout the winter, and that is the only difference I know of in the handling of the two herds.

A MEMBER.—Did the cattle get watered out-doors?

Professor DAY.—No, both herds were watered inside. The point I want to make is this: that it is possible to raise healthy animals from infected animals, even badly infected animals. We have demonstrated that to our satisfaction. We have some very fine heifers now, whose dams were tubercular, and I do not think we have had a single re-action from these heifers. They were taken out of the re-acting herd and fed upon the milk of cows that did not re-act and they came through healthy. We have never discovered tuberculosis in a very young calf, even though the dam were very badly affected. Because the mother of the calf is tubercular it does not follow that that calf has a weaker constitution than a calf from a perfectly healthy cow, provided that calf has not been fed on tubercular milk but on sound milk.

A great many people are afraid to undertake any method of eradicating tuberculosis in their herd, because they are afraid they will suffer by the ignorance or prejudice of their neighbours. While I think the most perfect system, possibly, is the one outlined in this pamphlet, yet I think a man can take a herd badly affected with tuberculosis and in the course of years he can practically rid that herd of tuberculosis without following the Bang system in its completeness.

I would insist on certain things, one of them being that the stable should be perfectly ventilated and that the cows should get out-door exercise. Some cows have more resistant powers to the disease than others, and we should try to develop that power. How can it be developed? It seems to me something like this: We should give them rational treatment and take the calves and put them in a separate building and feed them upon milk from very sound cows, or sterilize the milk and thus raise healthy young animals to come back into that herd. While some of them will contract the disease, others will escape, and I believe that in the course of years a man would rid his herd of this disease.

If these young animals are kept in a stable with tuberculous animals and fed upon the milk of tuberculous animals, the wonder is that any of them escape, but even under these conditions, some of them will escape. Therefore, if you give them favourable conditions, the chances are you would not have a single unhealthy calf coming into your herd. It is not so effective a method as that outlined here, but at the same time I think it is a method that anybody would be wise to adopt if he has any suspicion that he has tuberculosis in his herd.

Mr. S. SMITH, Dewdney, B.C.—What would you do with the milk from these tuberculous cows?

Professor DAY.—Sterilize it and it is all right. It is just as good as any other milk; that is what we do with the milk from our herd.

Captain TOM ROBSON, London, Ont.—You would let the calves from these cows suck their dams for two or three days?

Professor DAY.—No, we do not; they probably take the first drink and that is all they get, and out they go into the other stable.

Dr. J. G. RUTHERFORD.—I am sure we have all appreciated what Professor Day has said, and I was very glad that he volunteered to take a hand in this discussion. The professor is right about ventilation, lots of fresh air. I suppose you have read the reports of the experiments we carried on over the river here, in which we kept a herd of infected cattle for three years absolutely in the open. They had a shed to sleep in. Owing to a misunderstanding the first year, the calves began coming in the month of December. The first calf arrived when it was 29 below zero in the open air. One amusing thing was, that these calves came with hair three and four inches long and they did very well. They were all practically tuberculous cows. One calf came from a tuberculous cow and died inside of six weeks of acute tuberculosis. Professor Bang, of Copenhagen, admits that perhaps one per cent of the calves from tuberculous cows are born with tuberculosis. That is a point that Professor Day should bear in mind; he has got that one per cent to figure on. He is quite right about the difficulty of being sure that you have a proper subject for demonstration, although a good deal can be done sometimes in making up one's mind about that by a careful clinical examination. That is one of the drawbacks of the tuberculin test, that the modern veterinary does not think it is necessary any more, to understand the clinical diagnosis of tuberculosis. He thinks all he has to do is to take a syringe and put the tuberculin under the skin of the animal and the operation tells him whether it has tuberculosis or not. If the animal was very carefully examined by one of our old-fashioned veterinarians he might find out whether he had a suitable subject for the administration of the test. We had a very handsome cow in that herd over the river; she re-acted and she was tested again six months later and she did not re-act. She was tested six months later again and did not re-act. She was tested at regular intervals for two years and did not re-act. We are great believers in the first test but not near so firm believers in any subsequent test of a re-actor. That cow was tested finally and re-acted. We were slaughtering them and this cow was slaughtered.

Dr. Trotter, Chief Veterinary Surgeon of the Corporation of Glasgow, and one of the best inspectors in the world, had put me wise to the fact that it was a good thing in cases of tuberculosis, where the internal organs were found unaffected, to go after the deep seated lymphatic glands imbedded in the tissues, in the meat as it were, as one very often finds them diseased. When we slaughtered this cow we opened her up; she had given a distinct re-action just a short time before but we could not find any tuberculosis at all, not a sign of it. One of our veterinary staff, who was with me, said, 'I don't suppose it is worth while going after these deep seated lymphatic glands in this cow but I thought it well to do so, and in the popliteal gland in one hind leg just above the hock, we found the germs. This gland, which is deep seated in the muscles, was as big as an English walnut and it was a mass of tuberculosis. You can imagine how a man would feel if he put his teeth through a thing like that when eating a piece of meat. That was the only place where the disease was found in that cow, therefore, you cannot always be sure, when you cannot find it in the internal organs that the animal is not affected.

When a man is cleaning up his herd, he must not take it for granted that an animal which has passed the test is safe to go into his herd. It is not unless it comes out of a herd in which he is absolutely certain that no tuberculosis exists, for this reason: There is a period of from eight to fifty days after an animal becomes infected with tuberculosis before the disease becomes so firmly seated as to enable that animal to re-act.

If you buy an animal and it is already infected, and if it has been infected too short a time and the disease has not developed sufficiently, that animal is liable to come into your herd like a thief in the night and bring the disease and infect your carefully guarded herd. Then there is another point, you say we must isolate any new purchase. Yes, isolate them for at least three months, not only from your herd but from each other. Suppose you buy a dozen cattle and one of them is affected, then you have the other eleven exposed to the infection. I could not select a better illustration of the difficulty surrounding the elimination of tuberculosis than that one particular point.

FOURTH SESSION.

WESTERN BEEF CATTLE.

R. J. Phin, Moosomin, Sask.

In considering the question of western beef cattle, one's mind naturally reverts to the range steer. Unfortunately, the range steer, owing to a number of causes, will not be available for export in any large number in the future.

In the first place western beef consumption has very largely increased. For instance, it requires about 40,000 cattle for the mountain and British Columbia trade and, naturally, consumption has very largely increased west of the lakes. Export and local transportation facilities have been poor, prices up to the last year or two unsatisfactory, and finally the settler with the plough and in fencing of the drinking places has put on the finishing touches in forcing a large number of ranchers out of business. The western beef steer of the future must, therefore, come from the farms.

It is a fact that there are not so many cattle on the farms per farm in the west to-day as there were a few years ago. Farmers in the mixed farming districts of Manitoba and Saskatchewan have not found cattle profitable and thousands of head of breeding stock have been disposed of in the past five years. I will illustrate to you why beef-raising has not been profitable to the western farmer. A few years ago I brought my first winter-fed lot of cattle to Toronto—three cars— in March. Export cattle were worth 6 cents in Toronto, and I received 5½ cents for mine of equally good quality when they left the west. It cost me 1¼ cents from Moosomin, Saskatchewan, to Toronto, for all freight and expenses including shrinkage, with a fairly good run, as runs go. That is, I was at a disadvantage with the Ontario feeder of 1¾ cents. On some other shipments I was from 2 cents to 2¼ at a disadvantage, and 2 cents would be a fair average difference. That is, with cattle 6 cents in Toronto they were worth 4 cents in the west, and with 5-cent cattle in Toronto 3 cents at Moosomin. These prices are not very alluring, and this is one of the main reasons why our farmers will not grow cattle. It cost me from Moosomin 1 cent for freight, feed, selling and other expenses. The other cent is lost from depreciation in quality, shrinkage in actual beef and the necessary shrinkage of cattle in transportation. The necessary shrinkage of cattle in transportation that distance, weighed full at both places, should not exceed 40 to 50 pounds, being less than one-quarter of a cent per pound on the value of the animal. The depreciation in value should not exceed ¼ cent per pound with good transportation. That is, we are losing ½ cent per pound for actual loss of beef and consequent loss through depreciation in value and weight owing to slow transportation. Since that time I have on three different occasions taken my cattle to Liverpool and London and the same depreciation in quality is seen

there. Our cattle, which, in Winnipeg, are fine and fat, present a sorry spectacle compared with American cattle. Once having seen them one is not at a loss to know why Americans are quoted so and so and Canadians are quoted so and so and ranchers so and so, and that the Liverpool *Meat Trader Jorunal* comments yearly at the end of the season, 'Canada still continues to send a large number of unfinished cattle.' The truth is, a large portion of them are unfinished en route, and I believe I am very conservative in my estimate when I say the unnecesary loss to the cattle industry of the west from slow transportation amounts to fully half a cent a pound on every hoof going out of that country, or seven dollars a head.

The railway company claim that eighteen miles per hour is the best they can do with stock trains. Local stock is handled on ordinary freight trains at from five to fifteen miles per hour. Why, when we took our stock and effects up to that country thirty years ago over the American lines, these appeared to have no trouble to make twenty-five miles per hour, and the change was very noticeable as soon as we crossed the border, as thousands of farmers will tell you. The whole trouble is, as far as stock trains are concerned, although we may put up a train of thirty cars the railway company immediately adds another thirteen to fifteen cars of heavy freight, making a train that is too long and unwieldy to make fast time even if the engine is powerful enough to handle it. A train of forty-five cars has too much slack in the coupling (about 30 feet) and will jar stock very badly if run at a high rate of speed. It loses too much time at all stops owing to its length and must take the siding when within fifteen to twenty minutes of a superior train, causing half an hour's delay, thereby spending far too much time on sidings for meets and passes. Local stock is picked up by way freights and heavy freight trains, and receives practically no consideration whatever over dead freight and averages, probably, eight miles per hour.

The railway company claim to reduce tonnage on all trains, having a certain number of cars of stock, by 20 per cent. This is practically no reduction at all of the length of the train since stock cars are 20,000 pounds capacity and average freight cars 60,000 pounds.

The whole situation appears to be that the railway companies have had more traffic than they could handle at most seasons in the past, and have been met with increased demands by their men and have resorted to the slow heavy freight as the most economical and practical means of handling the traffic offered. The live stock interests have suffered in consequence, and the service is less satisfactory to-day than it was years ago.

They have greatly improved their passenger service and have enormously reduced the cost of heavy freight transportation to themselves by better road beds, heavier steel, heavier engines, cars of twice to three times their former capacity, the use of the air brake, etc., but I am bound to say they have done little or nothing to improve the stock car or transportation of live stock.

They claim to wish to stem the tide of all wheat production and encourage the production of stock to keep up the fertility of the farms, and to lessen the enormous grain traffic thrown on them in the fall and winter months, and offer to furnish demonstration trains to our governments to encourage mixed farming. Let me say to them and to you that the first essential to get farmers to raise cattle and go in for mixed farming is good transportation for our stock. What we must aim at, I believe, and I have given the subject a good deal of consideration—have been over the road a good many times to Toronto, Montreal and London, and know the conditions fairly well—is for our stock to be handled on passenger time. If they will reduce the length of stock trains to from twenty-eight to thirty cars I believe they can easily make passenger time, in fact they have done so at various times in my experience when stock has been delayed and the mischief was done and I could reach the proper official.

What I would suggest is that the live stock interests combine in an effort to secure stock trains to be handled on passenger time, and on all main lines a daily scheduled train to run at passenger time to pick up local stock on all divisions on which stock were offered.

Then we should have a chilled meat system established as early as possible. Although the British people have been very prejudiced against frozen and chilled meat, yet they are year by year using it in larger quantities at higher prices. The demand is less and less for home killed, and it takes a very limited number of live cattle to break that market below a profitable basis to-day.

Next as regards production we should show farmers the advantages of better summer and winter-feeding their cattle, and thereby reduce the flood of half-fat stock on our markets and bring stock in to winter or for sale in good shape.

A few years ago I was forced to consider this matter of better summer-feeding to act as a sort of safety valve in my business. One fall, after a poor cattle season, I found myself in this position. I exported three hundred head at a loss of ten dollars each and had four hundred head left. Of these I wintered one hundred and fifty, and winter-fattened two hundred and fifty head. I succeeded in fattening them, but owing to shortage of water and the large number I was forced to market them in February and March. Owing to low prices and very bad transportation of one shipment they were not profitable. I wished to provide against this condition of affairs.

In that country almost all farmers bare fallow their land every third year. I fenced my fallows yearly after that until the farm was fenced, taking in any adjoining broken land, and grew rape on them and have never had a bare fallow since and sometimes had as much as two hundred acres of rape.

I plough my land, if possible, in the fall, and if not, as early as possible in the spring, and give it surface cultivation and packing till the last week in June or first week in July. May and June are our best germinating months for seeds, as through July and August it is often too dry and later too cold for germination. Therefore, I get rid of most of the weeds by the first of July, get the soil in a thorough state of cultivation and sow a rape in drills on the flat thirty inches apart with an ordinary grain-drill and two pounds of seed per acre, using scorched seeds or any other material of similar weight to the rape seed in equal quantities so that it is not necessary to set the drill so close, as to cut the seed to sow as low as two pounds per acre. We run a one-horse cultivator once through to kill weeds, promote growth and conserve moisture. We sow in drills and cultivate once, because if you were to sow broadcast and allow all weeds to grow your land would be sucked dry. Unless the land was very rank the succeeding wheat crop would be unsatisfactory.

As the rape grows rapidly we turn on the cattle about the middle of August. We turn them on any time except early in the morning when the frost is on. After that we let them go at will, but always try to have some grass pasture as well as the rape, as they require something to hold the rape, and they will be found a large part of the time off the rape. I would advise sowing about one-half an acre per head and have had no trouble whatever from bloating.

There are many advantages in having this succulent feed for cattle. Most of our farmers, who have not got a free run, have their cattle in small fields or herded, and the cattle do little good after the middle of August either in growth or fattening. The frosts come on, the grass becomes dry and pasture bare, cattle fail and cows fail in their milk.

With the rape, the cows keep in full flow and there are no bad results to the milk if the cows are taken off an hour before milking and are not allowed on the rape at night. The young cattle grow and improve in condition, and the stock to be turned off are either in prime condition to winter-feed or sell and the owner is in the best possible position. If he decides to winter-feed, his cattle are in the best possible shape provided he starts early and does not allow them to go back. Every experienced feeder

will tell you that it takes the best part of a month to get a beast well started that has once commenced to go back.

The rape-fed steer, like the steer that has had a free run, will take on flesh at once. He has a big liver in him and his organs and digestive system are in shape to make the most of his feed from the start. All he requires is sufficient to keep him improving and then finish off at the end, which is vastly different from attempting to put on flesh and beef on a run down steer, which is far too common a western practice.

There is also another advantage in the land being packed and the excess moisture taken out of it. The wheat crop from many of our summer fallows is unsatisfactory, owing to too rank growth of straw causing late ripening, rust, lodging and consequent poor filling. Seeding some forage crop and pasturing results in a shorter stiff straw, which ripens early and fills well and has been with me invariably clean.

It may be thought I have dwelt more fully than necessary on this subject of growing feed on our summer fallows. Our Manitoba and Saskatchewan farmers are wedded to wheat. We have the wide open area and it is through wheat production they are in the prosperous condition in which thousands of them are to-day. Therefore, it is impossible to induce them to raise cattle unless it can be shown that by having their farms fenced and by growing some feed on their fallows they will save work in the destruction of weeds, pack their land and insure an earlier wheat crop which can be handled at less expense than the ordinary rank fallow crop and at the same time provide succulent feed for their stock. In this way there is some chance of gradually inducing them to raise more cattle.

Then as regards the wintering of our cattle; too many of our farmers feed straw, only with the result that the cattle make no growth and are much reduced to what they were in the fall. They look upon cattle as a sort of necessary evil and always appear to me to be trying to get something out of nothing. You may do that in western real estate, but it won't work out in the cattle business. I always make a practice of feeding my young stock a little green feed and grain with the straw, as we have no roots and little hay, and in that way keep them growing throughout the winter. This practice of failing to supply sufficient summer feed for cattle and wintering young stock on straw is one cause of our markets being flooded with half-grown, half-fed cattle. Our farmers in Manitoba, Saskatchewan and southern Alberta are the principal offenders in this respect, and only a very small percentage of export stock comes from the farms. Ranchers seldom market their cattle until they have sufficient age, weight and condition to market to the best advantage. They are also more careful about the breeding of their cattle and usually ranch cattle show good breeding. On the other hand, farmers have been reducing their stocks, looking upon them as being unprofitable anyway, and, consequently, they have become careless about the breeding of their cattle. This is a great mistake—an equally great mistake, too, is the failure to feed sufficiently to make proper growth. The two must go together to obtain the best results. No matter how well you feed you will not succeed if you have not got the breed and proper conformation, neither will you succeed with the best of bred stock without feeding sufficient to make continuous growth. I do not, by any means, mean that cattle should be necessarily pure-bred. In fact, I think it would be a great mistake for the ordinary farmer to start with pure-bred stock unless he was specially adapted to the business and was prepared to give them the necessary care and attention to obtain the best results. What I do mean is that he should use pure-bred bulls of good size and quality and improve his stock in that way. As to winter-fattening, I have done so in almost every conceivable way and find you can feed the big steer in almost any way provided he has water, shelter, plenty of feed and attention. I have fed them tied up and loose in stables, in outside sheds and in the barn-yard.

One winter I fed one hundred steers in the barn-yard without the sign of a shed and they did about as well as any inside cattle, had better digestion, required little,

if any, more grain, but ate a great deal more straw and other roughage. One of the greatest drawbacks to winter feeding in that country is the water supply. Our country is not so well watered as eastern Canada and we have more difficulty owing to the severe frost. The best system I have found, where water has to be pumped, it to use a small gasoline engine and a large circular drinking tank, say eight feet across and two feet deep, two-thirds of which is in a tight, well-built pump house with a tank heater on the inside and lid to be opened and closed at will on the outside. This is where you have not good barns and cannot have your water inside on the Ontario plan.

It would be suicidal for any farmer to attempt winter feeding without an ample water supply, because it is usually necessary to feed into the May and June months to get the remunerative price. There are, therefore, to sum up, four main essentials to the increase of the beef cattle industry throughout the farms of the west.

1st. *Better transportation*, and this includes a chilled meat system.

2nd. Show the farmers the advantages of growing succulent feed on fallows, both as regards the grain crop and bringing stock in to winter in the best condition.

3rd. Show farmers the advantage of better wintering the young stock and of having stock to be winter-fed in a thrifty condition to begin feeding.

4th. Show farmers the necessity of greater care in the breeding of their cattle. It is only the well-bred, well-finished animal that will show satisfactory results in the long run.

WESTERN BEEF CATTLE.

Discussion led by Geo. Lane, Esq., Calgary, Alta.

I have been asked by your Executive Committee to lead this discussion on 'Western Beef Cattle,' and I have also been asked, as President of the Horse Breeders' Association of Alberta, to protect the horse interests. I am also Vice-President of the Western Stock Growers' Association, and that body has asked me to look after its interests at this convention. In taking up this subject of 'Western Beef Cattle,' I propose at the same time to express my views on mixed farming which is, after all, perhaps the most important phase of the questions under consideration.

Now, gentlemen, I have come down here from Alberta to try to protect the interests of the poor old cow, the animal which has driven the mortgage away from the farm, the animal which has made so many homes happy, and which, in spite of this, has been and is now being destroyed in the west in such a shameful manner.

Last year, 30,000 calves were killed in our western country. All these calves were still sucking their mothers and were all of the very best beef strains that could be produced. In addition to this I want to tell you that, at a very conservative estimate, at least 65 per cent of all the cattle that were slaughtered during 1911 in Alberta and British Columbia were she stock, and when I tell you that our western country is capable of carrying 300,000 to 500,000 head of beef cattle per year, you will, I am sure agree with me as to the seriousness of the situation.

We use in Alberta and British Columbia about 130,000 head of cattle per year, and in Manitoba and Saskatchewan, so near as I have been able to gather from the figures, about 150,000 are used.

The wholesale destruction has been going on for a number of years until we have dropped down to scarcely cattle enough for our own home use.

I have here the cattle export figures for the six years commencing with 1906. These show a steady drop each year down to 1911, and you will see that in 1911 these exports are less than 16 per cent of the number exported in 1906.

In 1906 we exported in all from Alberta. . . . . 74,733 cattle.
In 1907 we exported. . . . . 42,960 "

In 1908	61,810	Cattle.
In 1909	67,257	"
In 1910	51,627	"
And in 1911, only	11,869	"

You will see that this decrease has been going on for a number of years, and that the exports for 1911 are less than 16 per cent of the exports for 1906, and in addition to this the export figures for 1911 are less than 25 per cent of those for 1910.

Now these figures show an enormous drop, instead of the gain we should have. When people started in to destroy their herds in Alberta, and by this I mean the spaying and beefing out of their breeding stock, I used to say to them, 'Now, this principle is wrong altogether'; and some of our best cattle men said to me, 'No, we can buy stockers cheaper than we can raise them.' I never believed this, although they used to try to prove it to me with figures.

Now the day has come when I do not know of any country where a man can buy steers to go on feed or on his range.

A few years ago I bought a bunch of cattle in old Mexico, and a short time ago I thought I would try to see if I could buy any more there. The price I was quoted this year for yearlings and two-year-olds was just three times what I paid seven years ago, and they seemed to be hard to get at that.

I see by the statistics of the United States that in that country there are 7,000,000 cattle less than there were ten years ago in spite of the fact that they have 21,000,000 more people.

Although we have been talking particularly of cattle, I wish, before going further, to draw your attention for a moment to the money we have paid out in the west for horses during the last two years.

We brought last year from eastern Canada 21,832 horses, which at an average price of $275 means over $6,000,000 of our money left in the east for horses during 1911. In addition to this 4,240 horses were imported to the west from the United States (without including horses entered duty free, as settlers' effects), and valuing these at the same average price this means that $1,166,000 was paid by the west to the United States for horses during 1911.

In 1910, 33,571 horses were brought to Manitoba, Saskatchewan and Alberta from eastern Canada and the United States. At the same average price of $275, a little computation will show you that in 1910 we paid out $9,232,025 for horses from eastern Canada and the United States, in spite of the fact that there is not either in Canada or the United States (nor in fact in any other country), a place where the horse can be raised as cheaply as he can in Alberta and Saskatchewan, or where he will grow to be a better animal.

Now, as you know, I have been a breeder of horses for a great number of years; I have always been in close touch with the situation in the west, and I feel quite safe in saying to you that there is not, in my opinion, the slightest danger of overstocking horses in Alberta and Saskatchewan during the next ten years at least, on account of the land that will come under cultivation during that time.

Now, to take up mixed farming, I want to say first of all, that I think certain parts of Saskatchewan and Alberta are the greatest mixed farming country in Canada to-day, and I greatly doubt if their equal is to be found in the United States. The only State that I know of that equals it in any degree is Colorado, and you could put the State of Colorado in one corner of the Province of Alberta. I was told, however, two years ago that Colorado fed 600,000 lambs and about 120,000 beef cattle per year.

It was only last month that I went down into the Twin Falls country in the State of Idaho. In the Twin Falls irrigation tract, which is 40 miles long and 12 miles wide, I found 400,000 tons of alfalfa hay, and in the neighbourhood of one million sheep on feed, together with a great many cattle. I went down there intending to buy some wethers, and while there met a man originally from Kingston,

Ontario, named R. F. Bicknell, who may, perhaps, be known to some in this audience. He offered me 20,000 head of two-year-old wethers, and was in a position at that time to sell me that number or twice that number.

I may say right here that when I got the railway rate and the duty and then figured this against the New Zealand mutton it put the deal right out of business.

Now, if I am any judge, we have in western Canada a better country than that, yet we bring 65 per cent of the mutton used in Alberta and British Columbia from New Zealand and the United States.

In addition I may add that we do not raise 25 per cent of the hogs used in Alberta and British Columbia.

My authority for these last statements is my accurate knowledge of the country, and I also have been told this by Mr. Pat Burns himself, and also by a member of the Swift's Canadian Company, and the authorities of the Canadian Pacific railway.

Now, if I were to go into details and give you the figures showing how much money we have paid for the hog products that are being brought in, and which should be raised in the country, you would wonder where we were getting the money from, for no man ever saw a business more thoroughly destroyed.

You may say to me, 'What helped to bring this about?' and I would have to say that, in my opinion, very low markets was the first reason for the wholesale destruction of the beef herds.

Then when the government put the two years' clause in the leases it had a great tendency to make cattlemen very restless. These men said they could not afford to take chances on keeping a large herd of cattle and being compelled to go out of business after a couple of years.

When the farmers commenced to come into Alberta and Saskatchewan, it was said and generally thought that there would be more cattle in the country when the farmers came in than when the big ranchers were running it. Now, in my opinion, this has not proved true, and it has never proved true anywhere in the United States. Texas to-day has 6,000,000 beef cattle, and the only state that has half that number is Kansas.

Now, on top of all this, there began to arrive in the west the men who made it a business to sell wheat lands. Now, I am sure I am not exaggerating when I say there are over eight thousand real estate men selling land in these western provinces, and it is safe to say that at least 95 per cent of them talk wheat and nothing else in their efforts to sell land to the people.

Now a great many people may know something about mixed farming, but they are continually being persuaded that 'wheat is king.'

After the land agent has done his part, along comes the steam plough agent, and the gasoline agent and half a dozen other machinery men (all these being, as a rule, very clever salesmen), and in turn each of these men advise 'raise wheat.' Why? —the first man wants to sell his land; the second man wants to sell his machinery. Nobody advises the landowner to carry on mixed farming.

Now, they get their wheat and lots of it, and along with the wheat also they occasionally get frost, which means tons of frozen wheat—but no cattle, hogs nor sheep to feed it to. In this I am speaking only of certain parts of Alberta and Saskatchewan.

Gentlemen, it is a crying shame that there is going to be hundreds of thousands of tons of feed burned up in our country during the coming spring. This will be clear loss, while the money we are sending out of the country is also lost, and I leave it to your common sense to decide whether or not it is going to need even a greater country than our western Canada to stand such extravagance.

You may ask, 'What suggestions have you to offer for the remedying of these conditions?'

First, I would suggest that the experimental stations should enter largely into the raising and feeding of cattle, sheep and swine, with the view of demonstrating

the results possible from mixed farming. This will be bound to do a great amount of good. People have been talked to so much about raising wheat that they need to be shown plainly and with actual results what can be accomplished with carefully managed mixed farming.

The press can also help this work along by showing clearly, as they can show, where the advantages of mixed farming come in.

I am also of opinion that it would be to the interests of all the banks which have branches in the west to advocate to their customers the value of mixed farming. Something might also be done to help mixed farming by the banks as well as the loan companies by advancing money on good terms to their customers who carry a certain amount of stock each year.

We all appreciate very much what the railways have done in reducing the rates on pure-bred stock, and I feel sure they could be induced to assist in the matter of demonstration farms.

These demonstration farms are, in my opinion, doing a great work for the west Now and then you will hear a man say, 'Oh, I would not listen to those professors with the stiff collars,' but you will find a great many others writing to these farms for information on different points. When a man gets this information he uses it, and his neighbour will soon be using it as well.

Now, right here I want to make another suggestion to help to encourage the live stock industry in the west.

I would suggest that in order to encourage the cattle, hog and sheep industry in Alberta, that the packing companies which are doing business in the west should each contribute the sum of $1,000 each year for five years to the prize lists of the different fairs in the provinces, this prize money to be given for the best fat cattle, sheep and swine. This should do a great amount of good.

I would also suggest that in regard to homesteaders going in for mixed farming, it might be possible to arrive at some arrangement with the Department of the Interior, whereby it could be stipulated that men taking up land must have a certain amount of stock on the *leasehold* at the end of the second and third years. This might be accepted by the government in lieu of some of the other homestead duties now required.

Now, gentlemen, I have lived in Alberta for twenty-nine years, during which time I have been engaged in the general ranching business. I have seen a great many ranchers start in that country, and I want to say that I have never in that time known of three men who lost their money, where they carried on mixed farming, raising cattle and horses with sufficient fodder to take care of them, at the same time attending to their business, and spending their time looking after its interests, not loafing around hotels, barrooms or billiard halls.

On the other hand I have known of at least one hundred to one hundred and twenty-five men who came west and started at from $10 to $40 per month, who to-day are worth anywhere from twenty-five thousand to two hundred and fifty thousand dollars; some of them, indeed, have gone up to the million mark, about ten, of whom I have knowledge, having retired from business and gone to Victoria, while a number of the others have scattered to other provinces. I think I could tell you the names of every one of these men.

Just here I think it only fair to say for the benefit of the mothers and fathers of the boys who have come to us from eastern Canada, that these are the most successful men we have. While 95 per cent of them started right at the foot of the ladder, receiving, as I have before stated, only from $10 to $40 per month, they are men of whom the east might well be very proud.

I might also add before concluding my remarks, that I think it is only fair to the different breeds of cattle to name those breeds with which I have had the best success in Alberta. I think most of our western breeders will agree with me that the breeds giving most satisfaction in Alberta and Saskatchewan are the Shorthorns and the

Herefords. I am of the firm belief that certain parts of the country are adapted for the raising of certain breeds of beef cattle just as much as certain parts of the country are better adapted than others for the raising of apples or peaches.

Now there has been a great deal of talk in our country as to what governs the price of cattle. It has been generally said that the abattoirs and packing houses govern the prices. Now, I do not think this is true. It may be true in some instances where men get into towns or cities with small shipments, but our market has always been governed by the export trade, as until last year when we only had a little over eleven thousand cattle to export it was impossible for the packers and abattoirs to tell just how many cattle were in our country.

Now, I know from my certain knowledge that one packer, who two years ago got more cattle than he could use, exported them himself and his actual loss was more than fifty thousand dollars.

A great many people here know the live stock export man, and do not begrudge any man the money he makes out of export cattle. I have exported a good deal, and I hope I will never have to export again under the same conditions as before. Now, gentlemen, we never get a steer from our country to the old country for less than $28, and from that to $32. Now is this not an awful tax on any country to have to pay to get to a market. The only remedy I know of is in the hands of the government, the railways and the steamship people, who by an earnest effort might reasonably reduce the expenses of transportation.

On the other hand, I do not think any man need be afraid to go into the export cattle business, as everything points to a continued shortage of beef in all countries, and especially with our population growing as rapidly as it is.

Now I do not want Ontario to think that the west is the only wasteful country. At their winter fair at Toronto a short time ago I saw beautiful Shorthorn heifers weighing from 800 to 1,000 pounds being sold to the butcher.

EASTERN BEEF CATTLE.

Mr. John Gardhouse, Highfield, Ont.

I take it that when the committee selected the subject, 'Eastern Beef Cattle,' the subject they have asked me to speak on, they had in mind the province of Ontario and the provinces to the east.

In dealing with this subject, I think it best to treat it by asking a couple of questions in commencing:—

First.—Are the farmers in eastern Canada breeding and feeding a sufficient number of beef cattle?

Second.—Are the animals that are being bred and fed as good specimens of the beef breeds as they should be?

First.—Are the farmers in eastern Canada breeding and feeding a sufficient number of beef cattle? My answer to this question is, 'No.' We cannot escape the conclusion that the production of beef cattle has not kept pace with other branches of the live stock industry. When we stop to consider the increase in the population for the last few years and the decrease in beef production which has taken place, it is quite evident that a wide gap may develop in the supply. The home consumption is growing much faster than the supply of good cattle. The shortage of beef cattle can best be judged from the facts that the prices for feeders this fall have been from 4½ to 5½ cents, and but few stables have their usual supplies. Inquire where you will from the farmer, the drover, or the buyer as to the outlook for good beef cattle and the answer is the same. There is every prospect of a great shortage in the near future. The scarcity of feed in Ontario is sending many cows and young stock to

the market in an unfinished condition, which is certainly going to have its effect on the future supply of beef cattle. The high price of land and the dairy demands have upset beef cattle breeding and feeding on many farms. In talking with a gentleman engaged in the export business for years, he tells me you may draw a line, say from Peterborough east and, owing to the great increase in the dairy business, there are practically no export cattle to be found. In fact, they are not, in all that section, raising enough beef cattle to supply their own requirements.

Second.—Are the animals that are being bred and fed as good specimens for beef production as they should be? My answer again is, 'No.' This is a question that our stockmen and farmers, as well as our governments, might well take into their consideration. The invasion of the dairy breeds has driven the dual purpose Shorthorn cow, in many places, out of the field. The fashion of the times has been to specialize along dairy lines, and the demand for milk products has been insistent, in some cases, to the detriment of beef production. It were far better that our beef supplies should come from our home farms, and, I think, the best system of farming to produce this is that of mixed farming with the large-framed, even-fleshed, big-bodied, deep-milking Shorthorn grade cows, bred to a first-class pure-bred bull, such as we used to find on many of our farms in older Ontario, as well as in some of the other provinces. When our supply of dairy products was not short, the stocker trade was always satisfied with the large, healthy, slick, well-fleshed calves that grew up to feeding age. They gave the breeder and feeder a good profit and produced as well a first-class carcass of beef for the consumer. I may say that in eastern Canada there have been four of the beefing breeds handled for the purpose of beef production, namely, Shorthorns, Herefords, Polled Angus and Galloways. I may also say that the large majority of our beefing animals have, up to the present time, been of the Shorthorn strain. In fact, in most of the beefing sections, until very recently, the foundation stock of breeding females have been entirely Shorthorns and their grades.

I wish now to give what I consider a few reasons for lack of progress in the beef industry.

First.—The indifference of too many of our beef-growing farmers. They do not manifest that degree of enthusiasm and love for their business which should characterize the action of men who are anxious to make the very best out of it. They do not exercise sufficient care and judgment in the breeding of their animals, and after they do get them, in too many instances, they are not sufficiently well cared for. Perhaps it would be interesting to know what a large percentage of our young stock are housed in the fall in fairly thrifty condition, yet when they strike the grass, the following spring, while they have grown, they have become so much shrunken in their general condition, that they are probably very little heavier than when they were stabled in the fall. Even after this scant nourishment during the winter, they are often not supplied with sufficient pasture during the summer. How then can we expect the best results from such treatment.

Second.—For a number of years, many Shorthorn breeders had become so engrossed in their desire to supply breeding males to the ranchers of the west that in their zeal they had almost forgotten that the Shorthorn was a milking animal. For years many of our breeders almost entirely overlooked this characteristic of the breed, with the result that when the general farmer and breeder of Shorthorn grades came to look for a pure-bred sire, he found it almost impossible to obtain one which he could rely on to transmit milking qualities to the offspring. He, ever mindful of the every day returns of a good milch cow, sometimes used sires of indifferent breeding, and very frequently, sires of the dairy breeds. Such a system of breeding could only prove fatal to the best interests of the beefing industry of the country. However, as the result of a determined agitation against the conditions in the Shorthorn world, there has been an awakening in the minds of our Shorthorn breeders along these lines, with the result that many of them are endeavouring to reproduce and make prominent the milking characteristic of the breed.

Third.—Many agriculturists have been telling the farmers that it is impossible to get the beefing quality and milking quality in the same animal. No doubt they were honest in their convictions, and those convictions have had the effect of causing many of the farmers of whom I have spoken to feel that it was useless to look any more for the milking quality in the pure-bred Shorthorn sire, and so confirmed them in the use of those indifferent males.

Let us look for a moment at conditions in the old land. In that great home of the Shorthorn, we are told that upwards of seven-tenths of all the stock used for dairy purposes in Britain are Shorthorns and Shorthorn grades. We do not pretend to say that perfection of beef type can be quite so closely approached on the average by a dual purpose as by a special purpose beef strain; neither would we claim that quite as high an average of milk production can be attained as by the special purpose dairy breeds. What I do claim, and it is supported by abundance of evidence in England and also in Canada, is that a profitable combination of these qualities can be attained, which will suit the requirements of a great many of our farmers for the economical production of good, even-fleshed beef on high priced land.

Fourth.—During the past year or two, owing to the scarcity of feed and the additional demand for beef, animals much younger and in a less finished condition have been sent to the market. I have no doubt, when the returns for this year are issued, they will show a great shrinkage in beef cattle. In order to remedy these unfortunate conditions, and place the beef cattle industry in the forward condition which its importance demands, we must continue to preach the doctrine of more skillful breeding and a more profitable system of feeding and management than has been followed in the past. Could not our Department of Agriculture, with its high conception of the importance of the business, direct and convey these principles to the general public in such a convincing way that the farmers will realize that the breeding and feeding of first-class beef cattle is both interesting and profitable. I have often wondered if there was anything more pleasing to a real stockman than to go into his stable and look over a first-class lot of those well-bred, healthy, thrifty, broad-backed, even-fleshed steers that must give him a good return for his labour and money invested.

In order to make the beef business a success, we should never weary of emphasizing the fact that skill must be exercised in breeding, and that when the young animal is dropped it must be cared for and fed in such a way as will bring it to maturity as early as possible. If our farmers will follow along these lines in eastern Canada as well as in the west, there should be no scarcity of those good healthy animals that are good feeders and will produce those high-priced cuts and juicy steaks that are being sought after more and more each year, and which are very difficult to get at the present time at any price.

Probably, if there is one thing more than another, that should be pressed home to the farmers of eastern Canada, it is to protect and grow up every good heifer calf of the beef breeds that is dropped so that we may have a sufficient number of good females coming along in order that we may raise the class of beef which is now so much in demand in this country.

Discussion led by J. F. McLean, Harris Abattoir Company, Toronto.

I owe a word of apology to this meeting. I agreed about ten days ago to be present to lead in this discussion of Mr. Gardhouse's paper, but since that time I have been away on a business trip and have had no opportunity of consulting with Mr. Gardhouse. My remarks, therefore, will not be worthy of the occasion, but I trust you will accept this word of apology.

I presume this meeting consists almost entirely of breeders of live stock. The interest with which I am identified depends entirely for its raw material upon the breeders of live stock. The breeders' interest and the packing-house interest very

rarely come into immediate contact as they do in this meeting, and perhaps those engaged in these industries devote less attention to the problems of each other than would be beneficial. The breeders of cattle and the packing-house men ordinarily come together only on the cattle market, and their attitude is determined to a greater extent, than it should be, by that fact. When you come on a market with cattle to sell, your interests and our interests appear at the moment to be diametrically opposed. I need not tell you that the packing-house man tries to buy your cattle for as little money as he can and you, naturally, try to sell your cattle for just as much as you can get, and it seems to me that the relation between the breeders and packers has been coloured by that circumstance to a very much greater extent than is necessary or is beneficial. We may as well recognize at the beginning that when we do come together to buy and sell, each will look after his own interest to the greatest possible extent, although, probably, in a broad sense, the interests of these two industries, in which each is depending on the other, must be identical.

I cannot tell you anything about the problem of raising cattle, but it occurred to me after listening to the addresses this morning that the cattle-raising problems were very much the same as cattle-killing problems, only there are different ramifications and different conditions under which each business is conducted. What are the main purposes by which a packing-house man seeks to guide himself in the conduct of his business? A packing-house man seeks volume. I do not want to preach to you because, perhaps, every man in this audience knows more about the cattle industry than I do, but it seems to me that on that point there is a divergence of opinion between the two bodies. I do not mean that the packer has any right to dictate to you, but the packer seeks always to increase his volume. He studies up the market and if he can do a greater business, whether the profits are greater or less, he is satisfied, and I think that would be a good principle for the breeders of cattle to apply to their business.

Mr. Lane mentioned that only 25 per cent of the hogs that are used in western Canada are raised in western Canada.

Dr. Rutherford.—Twenty-five per cent of the hogs used in Alberta and British Columbia.

Mr. McLean.—There are farmers in Alberta and British Columbia that have a home market that must be profitable. If every farmer in Alberta and British Columbia set himself to the realization of that fact, they would certainly be able to make money. It may be that the conditions there make it difficult, but almost anything is possible if a man goes at it with the right kind of intelligence and the right kind of determination to stick at it once he has made up his mind that a certain line of conduct will be profitable.

The second note that I made is as to the purposes that guide the packing-house man in the conduct of his business. The packing-house problems are not essentially different from the problems of the stock breeder, because business is business all the world over and the principles that make for success are the same, and as Mr. Phin referred to the growing of rape and making use of his fallow land, I presume that land was none the worse for the growing of rape on it, but better. Failure or success in business depends on the management, and I presume this cattle-raising business depends on intelligent and energetic management.

The third point I want to make is persistency of effort. Letters written to the papers by cattle breeders or farmers very frequently complain that if they raise more cattle, the packer immediately puts down the price. Now the packer does not put down the price. He has to buy just cheaply as he can, just the same as you try to sell all the cattle you have at as high a price as you can. That is the principle on which business is conducted. I believe that the people who breed cattle and raise them are very much the same kind of people as those who kill them. The same characteristics predominate and, I believe, the attitude towards one another is of

fairness, and there is no justification for the superfluous criticism of the packing-house man towards the breeders, and there is no justification for constant criticism on the part of the breeders towards the packing-house man, and I really do not think there is any such general attitude.

I spoke of persistency in the line of conduct. One cannot step in and out, one must not be deterred by difficulties and disappointments. Reference was made in Mr. Stevens' paper to the exporting of dressed beef. I do not believe the exporting of dressed beef from Canada to Great Britain is possible, and the reason it is not possible is that Canada's competitor for that trade is Argentina and South America, and they can raise cattle more cheaply than we can. The company that I am identified with was organized to carry on a dressed beef trade with Great Britain. For six months we booked space and made contracts for space on the ocean steamers and we filled out space, but we had to stop at the end of six months because we had no more money to go ahead with the business and the trade had to be abandoned. The only alternative we had was to go out of business or develop a home market, and we set ourselves to the development of a home market. That is the law of self preservation. You have got to make money if you are going to stay in the business.

I presume it is a fact that in certain years, the raising of beef cattle is not profitable, while in other years, it is a very profitable business. The man who tries to hit the profitable years and escape the unprofitable ones will make a failure. No man can predict the markets because, if he could, he would only have to stay in the business six months. The fundamental law of business is that a man must make up his mind what he is going to do and then set himself to do it as well as he can and not to be discouraged.

One principle on which packing-house business is conducted is the utilization of by-products, and that may be a feature of the stock-raising industry that, perhaps, does not get attention. If a breeder makes up his mind that a certain year has been unprofitable, has he sufficiently taken into account the value to his general business of the raising of these cattle? Suppose that his ledger showed he has a debit balance instead of a credit balance, he should take cognizance of the general advantage to his whole situation. I do not say that by way of instruction, but as a fundamental consideration in the conduct of business. The constant aim of the manufacturer is to make use of every bit of material that ordinarily goes to waste. A revolution has occurred in Canada in that respect in the last ten years. The Canadian packers deserve no credit for the conception of the idea; they simply followed in the wake of the American packers. The American packers discovered it largely by accident. One of the most important by-products from the killing of cattle is fertilizer. It amounts to hundreds of millions yearly in the United States, and that industry commenced simply through an accident. Perhaps not exactly from an accident, but because the utilization of these products was forced on the packers by the health authorities in Chicago. Year after year the health authorities were prosecuting the packing-house people for polluting the river. They used to run the blood and offal into the river and the packing-house men had to subsidize the police authorities year after year. They had to pay them immense sums to allow them to continue to run this valuable stuff into the river. One day a German chemist happened to walk into Mr. Armour's office and told him that he could make a valuable commercial product out of this stuff that they were running into the river, and out of that developed the fertilizer industry which is largely controlled by the packers of the United States, and the turn-over of which amounts annually to hundreds of millions. The packers then set to work immediately to see what they could do with this and that and they used up all the by-products.

That suggestion may be worth while to the breeders of cattle as well as to the killers of cattle. You cannot make money out of cattle like you can out of real estate. Any business some years will be good and some years bad, but the law of

business is that the man who does a certain thing efficiently and persistently and with courage will ultimately succeed. There is no question in my mind that relatively cattle-raising is just as profitable as cattle-killing. I do not mean that a successful cattle-raiser will make as much money in a year as a successful cattle-killer. A packing house has a very much more largely and more widely extended business, employing, perhaps, 500 men. If a cattle-raiser were employing that many men he would probably be a very rich man. Some years cattle-killing business is profitable, other years it is not profitable. We do not 'holler' when we have an unprofitable year. The packing-house man is different in that respect from the breeder. The packing-house man cannot 'holler,' because if he does the banker gets after him and starts to withdraw his loan. The key note of the whole business is persistency and the application of the principle that constant improvement in business, by looking over new markets and by seeking to utilize what heretofore he has not utilized and by constantly seeking to improve the quality of the product he has to sell, is what counts.

Mr. Gardhouse gave reasons for the unsatisfactory condition in eastern Canada, and I may say the supply of beef cattle that is available for this year is very unsatisfactory. Judging by all the statistics that can be obtained, it is very, very small, and we are going to see famine prices in Canada before June or July; there is no question about that. Butchers' cattle are going to be 7 cents a pound and perhaps 7½ cents and perhaps 8 cents a pound. The reason for that is the one Mr. Gardhouse dilated upon, the indifference of the farmer in not selecting his animals for carrying over; that is the principle of the constant examination of one's business.

Mr. Gardhouse's second point was that another reason for the scarcity was that breeders in Ontario and eastern Canada had concentrated their attention on one market which, for the time being happened to be their most profitable market. They shipped all their good bulls to the west and so depleted their own herds. A man must be constantly on the lookout for his best market, but he must not lose sight of the time when, if he keeps on cultivating that market, he will have no more bulls to sell.

The dairy industry has been a source of the greatest profit to Canada, but it is a fact, particularly in the district Mr. Gardhouse mentioned, that beef cattle have become a thing of the past. That is a mistake, and that mistake is being made by the cattle breeders of that district who concentrate their attention on dairying and forget that it is a profitable thing to raise beef cattle, and the result is that beef is being shipped into that district. Five years ago, there was not a carcass of beef shipped from Toronto to any point in that district. This year, two or three or four carloads are being shipped every week to towns in that district. Cattle breeders, I think, would do well in a meeting such as this to review the situation and to get statistics, and get a broad outline and understanding of the general trend of the business.

Here is a dairy section; there is a beef section. Here dairying is being abandoned and there beef-growing is being abandoned. Is it profitable that dairying should be abandoned or that beef should be abandoned? Can we not conduct these two departments together? On this point I cannot speak as well as Mr. Gardhouse, although the opinion I have has always been along the line of the solution suggested by Mr. Gardhouse, that a strain should be selected that would be profitable for dairying and for beef. That seems the most rational thing to do. It is certainly most uneconomical for a whole district to go absolutely out of the raising of beef cattle. There is no question that beef-raising is profitable, and must be profitable, and always will be profitable, so long as farming continues.

My remarks have been disconnected and disjointed and I apologize for not having them more carefully prepared. If each of us knew the problems of the other, there would be more sympathy and co-operation in the solution of these problems that we have to face.

SESSIONAL PAPER No. 15b

DEVELOPMENT OF THE HOG INDUSTRY.

J. E. Brethour, Esq., Burford, Ontario.

I have been assigned a very large subject, as you will see by reference to the programme, and this subject can scarcely be thoroughly dealt with in the time allotted to me.

Like other important industries requiring skill in their organization and development, swine-rearing has undergone a marked change in Canada during the past two decades. In keeping with the march of progress in dairy farming, the raising of swine has made rapid advances. Stock-raising in Canada, as in all new countries, has followed rather than preceded the growing of grain as a marketable product. Even the early settlers raised a few hogs to supply themselves with meat and to provide a product acceptable to the local merchant in exchange for the needs of the household.

With the development of urban populations, and the growth of the lumbering industry, there grew up a demand for pork products. In the case of beef, the butcher very early became a necessary factor, while in the swine industry, the farm continued to combine the breeding and feeding operations with the slaughtering and curing of the meat. Then there arose a more or less extensive fresh pork trade, and most of us have a clear recollection of the loads of thick fat yearling pork that were hauled to market during the late fall and winter months. Size and fatness constituted the ideal in those days, and many an apology has had to be made for hogs sold under three hundred pounds by men who could not afford to feed them longer. Then farming was conducted as a comparatively simple industry without high expenses and independent of farm bookkeeping, and even yet there are those who argue in favour of the thick fat hog as a profitable proposition.

While the market for Canadian pork products was confined principally to a home demand, there was no incentive to change from the customs that had become well established, but so soon as we had an appreciable quantity for export, the requirements of the importing country had to be reckoned with. In the opinion of the producer a product may be ever so good, but unless its goodness is a kind that satisfies the ultimate purchaser, little hope need be entertained for the keen demand which is necessary to a high price.

It was, as it is to-day, the business of the farmer to raise the hogs, but to find a market depended on the commercial man who, in this case, was the pork-packer. Fortunately for the industry which expanded very rapidly, we had in Canada far-seeing and brilliant men engaged in the packing business, and while we may say what we will about these men, the development of the swine-raising industry depended more on the pioneers in pork-packing than upon any other agency. These men set a high value on the British market and had confidence in the ability of the Canadian farmer to produce the high quality of bacon and hams required for it. They then set about developing the right kind of hogs for the best trade, and what was done in the distribution of suitable breeding stock is an old story that need not be repeated.

The possibilities of the industry for Canadian agriculture appealed to our governments, perhaps, at the beginning, more especially to the legislature at Toronto, and those of us who were engaged in hog-raising will not soon forget the energy and effort put forth by the late president of this National Live Stock Association, the Hon. John Dryden, on behalf of the industry, nor of his superintendent of the farmers' institutes, Mr. F. W. Hodson, who conducted a most effective campaign on behalf of the bacon hog. Assisted by such able men as Prof. G. E. Day, of the Ontario Agricultural College, and others, by means of winter fairs and farmers' institute meetings, Ontario farmers were shown conclusively that the bacon hog was the most profitable to raise and the most readily sold in the best markets of the world.

The correctness of the teaching in those days is amply borne out by the report of the Swine Commission that visited Denmark and found that the Danish pig, from which the highest priced bacon in England is made, corresponds exactly with the pigs advocated for Canadian farmers and at the present time raised by them in every province.

The results of this campaign of education were very pronounced and promptly realized until within a few years the railroads leading to the large packing houses were loading hogs at almost every country station in Ontario once or oftener weekly with stock that came well up to the standard for the export trade.

Nor were the other provinces asleep in regard to the swine-breeding industry, as in each one of them excellent progress has been made, more especially in the matter of quality. In each and every province the 'bacon' hog is the standard, and the pigs that win the best awards at the maritime winter fair are of the same type, age and weight as those that take the ribbons in Ontario or in any of the western provinces.

Much credit must be given the excellent work accomplished by the Federal Department of Agriculture in uplifting the industry, more especially in the provinces outside of Ontario. Through the branch of the Live Stock Commissioner the teaching commenced in Ontario has been extended to all corners of the Dominion both at institute meetings and winter fairs, while these latter organizations have been induced to frame their prize lists so as to encourage only the bacon class of hog.

From small beginnings in the early nineties, the export bacon trade with Great Britain grew by rapid strides, until in 1905 Canada supplied Great Britain with about 20 per cent of her imported bacon. For three years this satisfactory level was maintained, but since 1907 a decline has been in operation until our supplies to the mother country have fallen much below what they were during those seasons of heavy export. The falling off, however, is not sufficient to cause any alarm, for we must consider the vastly increased number of mouths to be filled in our own country, while some of the rich agricultural provinces are not giving swine-raising the attention it deserves.

These facts are further brought out in figures, secured from the office of the Veterinary Director General in connection with the meat inspection service. In the inspected packing houses, there were killed in 1911, 1,239,748 hogs, as compared with 888,837 in 1910. This is an increase of 350,911 hogs, equal to almost 40 per cent. All provinces show increase except Manitoba and Nova Scotia, the former showing a decrease of 8½ per cent and Nova Scotia 3 per cent, while the increases were: for Ontario, 47 per cent; Quebec, 35 per cent; Alberta, 7 per cent, and Prince Edward Island, 64½ per cent. There are no inspected packing houses in Saskatchewan or British Columbia.

The slight increase of killings in Alberta in no sense meets the growing needs of the west, and this explains in large measure the failure of Canada to materially increase her export trade. Instead of shipping to the sea board as she did some years ago, her almost entire surplus of bacon, Ontario is now sending a constant stream of pig meats westward to feed the increasing population. The figures representing this trade are astonishing, for it is shown that of pork in one form or other, there were received at inspected establishments west of the Great Lakes from outside points in the month of December alone no less than 1,828,836 pounds, and this rate has been kept up for many months. These figures do not include importations made by other than inspected houses. This means that during the past year, there were consumed in western Canada something like 20,000,000 pounds of pork imported by inspected houses in addition to a large quantity distributed by other agencies. These figures should be of especial interest to the representatives from the west where there is so much feed grain and where agriculture is already suffering from the keeping of too little live stock.

The hogs of Canada have reached a standard of uniform excellence not surpassed by any other country in the world save, perhaps, Denmark. The short, thick hog of

the 'corn belt' has passed away, and raisers of breeds, previously too short for the bacon trade, have been stretching out their pigs to meet the popular demand. In our efforts to satisfy the fastidious palates of the mother country, with a view to capturing as much as possible of her market, we have developed throughout Canada the lean, fine-grained 'Singer' that not only turns out a delicious carcass, but gives the utmost satisfaction to the breeder and feeder in the matters of reproduction and economical gains for food consumed. It is no doubt largely due to the quality of our bacon that the home demand is so difficult to meet, as shown by the imports and exports of five years ago as compared with those of last year. In 1908, Canada exported 95,945,099 pounds of pork products, while the same year we imported 16,274,414 pounds or, in other words, we exported that year five and three-quarter times as much as we imported. In the nine months of 1911, after April 1, which are the latest available figures, our exports were 48,446,675 pounds as against 13,165,786 pounds imported. These figures show that we exported 3½ times as much as we imported. At this rate Canada will soon not be raising enough pork for her own requirements.

The development of an 'All Canadian' bacon hog, or an 'All Bacon' Canadian hog is strikingly reflected in our pedigree registration. During the past eleven years hogs of certain breeds have increased by leaps and bounds, others have more than held their own, while others again that showed signs of life some years ago, have passed off the stage so far as registration in Canada is concerned. The following table shows the numbers of pedigrees of each of the several breeds that had been recorded up to 1900, the number of each recorded up to the end of 1911, and the number of each recorded since the beginning of the present century:—

PEDIGREE REGISTRATIONS.

——	Up to 1900.	Up to 1912.	No. since 1900.
Berkshire	12,147	23,345	11,198
Yorkshires	6,681	39,379	32,698
Tamworths	2,398	8,873	6,475
Chester White	2,519	9,104	6,585
Duroc Jersey	706	1,338	632
Poland Chinas	2,595	3,116	521
Essex	20	272	252
Hampshire	.....	455	455

Suffolks and Victorias are no longer recorded.

This table shows that breeds recognized as best suited for the production of hogs of the bacon type have increased at a much more rapid rate in recent years than some other breeds which hold prominent positions in the United States. Nor do the numbers shown in the table tell the whole story, for we know that breeders of all the breeds have been aiming at the bacon type. To such an extent has this been the case that the most popular Berkshires and Chester Whites now found in Canada differ widely from the ideals set for these breeds in the countries of their origin. It is also shown that certain breeds of the thick type have practically ceased to be patronized by the farmers of Canada.

In the use of pure-bred sires to head breeding herds, swine hold a position perhaps in advance of other classes of live stock. The rate at which swine increase renders this possible. Unfortunately, however, all recordable hogs are not ideal by any means—a fact which far too many of our swine raisers fail to recognize. Even the breeders of pure-bred herds do not fully appreciate this truth, so that we find far too many inferior sires employed throughout the country. If the influence of the sire were more correctly appreciated, we would be able to claim not only an all-bacon

Canadian hog, but an all Canadian bacon hog that would still further increase our trade both at home and abroad and improve our position as farmers by the increased profits of our industry.

The continued prosperity of the swine industry cannot be maintained by the efforts of the farmers themselves. As the industry in its early days required and received the substantial support of the packers of that time, it still requires, on their part, active co-operation. Unfortunately, systems of buying have been allowed to creep in by the packers that do not tend to encourage the production of the higher class of hog. Nor do the methods pursued by the packers tend to stimulate production. While packers, like other business men, cannot be expected to conduct their business at a loss, it would seem to be wise on their part not to take advantage of liberal supplies to make an undue profit, a policy which cannot but result in discouraging hog-raisers who would like to continue in the industry but find it unprofitable to do so; such a policy creates a condition that is unprofitable to the producer as well as a hardship to the consumer, to say nothing of the partial idleness it at times brings about in the packing industry. Undoubtedly the pioneer packers in this country as well as in England showed a generous spirit towards the industry. The packers of the present day, however, have sought only their immediate interests, and in looking out for these have undoubtedly underestimated the intelligence of the Canadian farmer.

Discussion on the Development of Hog Industry. Led by E. C. Fox, Assistant General Manager, Wm. Davies Co., Ltd., Toronto.

Mr. Brethour's paper on the development of the hog industry has naturally dealt chiefly with its development in relation to the breeding and raising of stock. I will endeavour to supplement that view point by dealing with its development in so far as breeder, raiser and packer are mutually concerned. Perhaps with these two view points before us, we will be able to secure a better co-ordination of interests, in which I believe there is room for improvement.

I hope you will not be disappointed. I am not going to defend or apologize for the packers. Here you are—here we are—both legitimate industries, with large and intricate problems to solve. Some of these problems and questions are more or less mutual, and if this discussion brings us to a better understanding of some of them, it will have served its purpose.

In the development of the hog industry, perhaps the most important common problem is the character of hog to be raised. Our one ultimate purpose is to market our product to the best advantage over foreign competitors. The question of cure of meats is wholly a packer's problem, and need not be dealt with here except to say that the packer who neglects his cure neglects a vital part of his business, and helps in a general way to discredit the industry by giving people a dislike for hams and bacon, and indirectly affects the live hog industry.

There are three phases in connection with the character of hog to be raised which are of common moment to us, and which I would like to discuss very briefly. First —the intrinsic quality of the meat from the live hog. Second—physical form, or the percentage of various cuts to the whole carcass: for example, the proportion of the head, ham, shoulder, etc., to the live hog. Third—the total percentage of meat (that is ham, back, belly and shoulder) and lard to the weight of the live hog.

First: The intrinsic quality of the meat from the live hog.—No matter how ideal your hog may be from the standpoint of physical form, care must be taken in breeding that your hogs will make into meats possessing intrinsic merit, apart altogether from cure. By reason of governmental co-operation in Denmark, this point is well taken care of in that country, with the result that Danish hogs have the double merit of good physical form, and the intrinsic qualities of good, fine-grained meat, a well-streaked belly, and a back containing no fat in it or through it, except on the

back portion itself, and this layer of fat is uniformly even. Speaking generally, if these features were overlooked in hog-raising in this country, the hog industry would receive a set-back from which it would take it years to recover. I am well aware that there are certain portions of the country where we receive hogs with heavy, fat flanks and backs, and the back pierced by a continuous streak of fat through it. I am well aware that the owner of such hogs sometimes receives the same price as does the owner of the type presenting the better bacon qualities. We will deal with this question under another heading. Failure to recognize the above particuar points in breeding would speedily result in the complete destruction of an important export business, and our western Canadian buyers would cease to give product from Canadian hogs any preference over American meats, as far as quality is concerned.

Second: Physical form, or the percentage of various cuts to the whole carcass.—This is where the bacon hog, about which we hear so much, should be discussed. I would define the bacon hog as a hog which, in addition to possessing intrinsic qualities mentioned above, has a build which gives a maximum yield of the valuable cuts and a minimum yield of the less valuable cuts; hence a long side is desirable, not, of course, unduly elongated to become too thin, and a small shoulder and head. Lack of recognition of these features in breeding is a source of loss to the breeder, the farmer and the packer. To permit a majority of hogs to possess a large head, neck and shoulder would bring less money for the hog in finished products, and the immediate result would be a lessened value for hogs for all concerned. Such a condition would, of course, take a long time in coming about, but to guard against it by seeking constantly to improve the bacon hog in these respects is as necessary to the permanent development of the hog industry as it is necessary to guard against hog cholera. Because of trade conditions and methods of buying, an odd farmer here and there throughout the country may play fast and loose by marketing hogs which are not carefully bred, on as favourable a basis as his neighbour, who has been more careful in his selection. This is the odd case, and we are dealing in the large. Let such cases become general, and the hog industry would suffer a severe and permanent monetary loss.

Third: The total percentage of meats and lard to the weight of the live hog.—This total percentage determines the packer's cost, apart from labour and other charges, and is, therefore, of vital importance to him. Our bacon hog yields in meat and lard from 61 to 68 per cent of the live weight in the packer's yards. This variation depends partly on seasons and climatic conditions, but chiefly on the character of the hog itself. Fat hogs are excellent yielders, both in meat and lard, which meat, of course, costs less per pound than meat from a bacon hog giving a 5 per cent less yield. The meat from such hogs is fat and unsuitable for the ordinary bacon trade. Its market is limited, and although at times the packer may pay as much per pound for the fat hog as for the bacon hog, yet his actual cost for product is greatly less by reason of a greater total yield. Because of the greater yield from fat hogs, and because also of a greater value for offal secured in the United States, the Americans are and always will be able to manufacture cheaper meat than can be done in Canada. At the same time the American farmer receives less per pound for his hogs than does the Canadian farmer. It is hardly necessary to say that the general introduction of the American type of hog would be ruinous to the hog industry, because the Canadian packer with the bacon hog serves a different class of trade than is served by the American packer. Canadian breeders are working along the right lines in these respects. Now there is a limit to the yield which we can secure from the bacon hog, without having heavy, fat product, which would very quickly swamp the market and destroy trade. I am not prepared to say whether that limit has yet been reached on a bacon hog weighing between 175 and 190 pounds. It may be by careful selection over a period of years that a type of bacon hog may be evolved which, without impairing intrinsic qualities or physical form, may give a meat and lard yield of 1 to 2 per cent more than at present. The direct monetary benefit of such result would accrue to the

raiser of hogs, and would amount to a very large sum of money annually. An indirect benefit would come to the packer in a more firmly established hog industry.

All industry must either progress or recede. The interests of the breeder, raiser and packer of hogs are so inter-dependent, that the progress of one helps the others, and the decline of one section adversely affects all three. The breeder must constantly be on the alert to improve the breed, so as to produce a hog better adapted for the market, both in quality and yield. Failure in this respect results in a lowering of standard, which in turn affects the return to the breeder as well as to the farmer and packer. The packer, on the other hand, must be constantly watchful for as broad a market as possible, and for the best markets, in order to secure the highest returns. With the increase of scientific knowledge he must always seek to improve his cure, and to have the most modern methods of handling his by-products. Failure to be thus progressive results in ultimate loss of market, with consequent loss to the whole hog industry. Thus our interests are so interwoven that we have common problems to work out in the development of our businesses, one or two only of which I have endeavoured to touch upon.

In closing let me say a word in relation to the future of the hog industry. I feel safe in saying that no more British capital will come into Canada for the erection and operation of packing houses. British capitalists are going to Russia and Siberia, which two countries will soon be very important factors, indeed, in controlling the English bacon market. We are rapidly losing ground as exporters of bacon products, due to fewer hogs being raised than were raised a few years ago. True, Ontario has found a large customer in the west. This trade does not, however, offset the shrinkage in the volume of export trade of the last decade. We are at a crisis in the development of the hog industry. If we continue raising fewer and fewer hogs, just so quickly do we hand over a national and basic industry to foreign breeders, farmers and packers. In the coming years the demands of the export and Canadian markets will prove more than ample to ensure the permanency of a large and well regulated hog industry, producing weekly many thousands more hogs than we are turning out at the present time.

DAIRY CATTLE.

W. F. Stephen, Secretary Canadian Ayrshire Breeders. Association, Huntingdon, Quebec.

We are half an hour behind our schedule time and we will have to get through as quickly as possible, and I will endeavour to make my remarks brief. I will merely give you some pointers so that you can draw your own conclusions from them.

Mr. Brethour referred to the swine industry as being a great one. The beef men have referred to the beef industry as one of the greatest in the country, and the horse men rightly claim they have a great business, but I believe we dairymen can calm that we have one of the greatest, if not the greatest, industry in the country which pertains to agriculture. It is for me to champion the dairy cow—God's greatest blessing to mankind!

The dairy cow fills a threefold purpose: She may be used as a beast of burden; she gives the finest and most delicate of food and then her carcass can be used for beef, but, of course, she does not give you the fine sirloin steaks or the splendid under cuts that you get from beef cattle. The dairy industry is important from three standpoints. In the first place because it is the true system of agriculture. It increases the soil fertilization and enriches the farmer and increases the population. It enriches the soil and the pocketbook of every farmer in the country. I need not dwell on the fact that it is a soil enricher; that is admitted on every hand. The breeding and raising of the dairy cow on the land gives the farm more soil fertilization and

puts more on the farm than any other line of agriculture, and it gives us the greatest net return per acre, of course, apart from fruit farming and vegetable farming. Then it increases our population, because we manufacture the high-class products, milk and cream, into cheese and butter, and more labour is required to properly operate a dairy farm than to operate a beef farm or a grain farm or for the production of mutton and wool. Anything that brings labour into the country is an enricher of the country. Manufacturers talk at length about bringing people into our country to consume our products. The same thing may be said of the dairy industry. One of the greatest difficulties the dairyman is up against to-day is the labour problem. He has to compete with the manufacturer and others who take his labour away from him. There is a solution of this difficulty for the dairyman, and that is the bringing, from the old land, families from those places where dairying has been such a success. These men come to our dairies and make capable servants.

Figures are dry things in a convention of this kind, but I wish to draw your attention to the number of dairy cows in Canada in 1901 and compare that with the number in 1910. I endeavoured to get from the Census Commissioner, Mr. Blue, the returns of the dairy industry for 1911, but Mr. Blue informed me that these figures are not yet compiled, and I had to do the next best thing and take the statistics for 1910 which, of course, will not be quite as accurate as the census figures of last year. In 1901, the census returns gave us 2,292,120 dairy cows in Canada. Ontario led that with 1,000,000 and Quebec with 734,000. I find that in 1910, the total number of dairy cows in Canada was 2,905,982, an increase of 616,099. It may be interesting for you to know that Ontario made an increase of 22 per cent, Quebec 18 per cent, New Brunswick 16 per cent, Nova Scotia 17 per cent, Prince Edward Island made a decrease of 5 per cent. Manitoba made an increase of 26 per cent, Saskatchewan 160 per cent, Alberta 211 per cent and British Columbia 150 per cent. The three western provinces made the greatest increase, Alberta having the largest of all.

A few figures would not come amiss regarding the output of the dairy industry from 1900 to 1907, the last figures that have been available. The output of butter and cheese in Ontario was 15,000,000 and it increased to 17,250,000; Quebec in 1900 was 13,000,000 and it increased to 15,200,000; New Brunswick in 1900 was 245,695, increased to 377,800 in 1907; Nova Scotia 127,007 in 1900 and decreased to 71,113. Manitoba increased from 416,000 to 533,000; Saskatchewan increased from 30,230 to 38,500: Alberta increased from 126,400 to 387,000, and British Columbia increased from 105,600 to 1,426,700. In 1907, they had a drought in eastern Canada which hit the provinces of Nova Scotia and Prince Edward Island very severely, and I think that had something to do in decreasing their output during these years.

The total increase of our butter and cheese factories during these years was about $5,000,000. The increase for the four years from 1907 to 1911 would be about $4,000,000 as the output of our creameries and cheese factories. Added to this should be the amount of cream shipped to the United States during 1911, $1,100,000, and also the amount of milk shipped to condenseries of one-half a million, making an increase of about $10,100,000 during these four years. The total output of our factories would be about $44,500,000.

I have said nothing about the amount of milk and cream consumed in our cities, which is becoming a large part of the dairy business in Canada. Milk is no longer a luxury, it is considered a food. It is difficult to get an estimate of the consumption, but Professor Ruddick makes an estimate that the amount of milk consumed in cities is nearly $10 per capita. I think we are safe in putting it at $9 per capita, giving us about $45,000,000, or a total dairy output for the Dominion of $100,000,000 per year. That is what we get from the good old cow. I am looking forward to there being at least three million milking cows in Canada when the next census returns are published. The average of our dairy cows taken in the census of 1901 was 3,200 pounds of milk. We find that that has increased comparatively little. I believe I would be safe in saying

that the increase is not over 300 pounds, and I am looking forward to the next census revealing that the average output of the cows in Canada is about 3,500 pounds, and that is a comparatively small increase in ten years.

There is something wrong with our breeding operations in connection with the dairy industry, and I wish to point out a few of these errors. If we go to the Channel Isles or to Holland or Scotland, we find the very best of live stock, and we find that great care is taken in the breeding and raising of the young stock. They are not making such phenomenal records as are being made in the United States and Canada, but when we take their stock as a whole, we find there is greater vigour and prepotency and that they raise up their stock better than we do. Let me point out a few things that are not what they should be in Canada. In the first place there has been indiscriminate breeding from grade and scrub sires; then in the second place, breeding from young and immature sires, and in the third place mixing the breeds.

A few years ago, I had occasion to be at a gathering where there was a certain gentleman of rather peculiar appearance, and we got into a discussion as to what nationality he belonged to. Some thought he was Scotch, some English, and I took it upon myself to ask him what nationality he belonged to, and he said, 'Gentlemen, I was in a German settlement a few days ago and the same question was asked me and I answered in this way: 'One of my great grandmothers was Scotch, another Irish, another Dutch and another English. Now what do you call that?' One German held up his hand in horror and he said, 'Mein Gott, I call that hash.' That is what you have when you have all the breeds mixed together. Why men should still persist in mixing breeds, I cannot understand.

The fourth thing I want to point out is the failure to rear up the dairy calf. So many of our dairymen forget that the calf is the dairy cow and that it must be attended to. It must get the proper food to bring it on so that it will be a strong animal, so that when it comes to maturity it will be able to consume a large amount of fodder and give a large return in the milk pail. The fifth point is the failure of our dairymen to feed the dairy cow liberally. So many of our dairymen expect to make something out of nothing; a good deal like Pharoah wanting the Egyptians to make bricks without straw, we want the dairy cow to give back good returns on a straw diet and we cannot get it, but I am optimistic enough to believe that in the future, we shall have very much improved conditions in Canada. The signs of the times indicate that.

Let me point out to you a few of the signs of the times. In the first place, there is a greater demand for pure-bred sires; that shows that our dairymen are beginning to realize the value of our pure-bred sires. If you ask any of the dairymen who have herds of pure-bred Holsteins, Ayrshires, Guernseys or Jerseys, they will tell you there is a greater demand than ever before and that they are getting much higher prices. That is one indication that our dairymen are becoming alive to the fact that they must give up indiscriminate breeding and mixing of breeds. Another indication is the increased number of registrations in our pure-bred live stock associations. During 1911, the increase in the Holsteins, Ayrshires, Guernseys and Jerseys, and French-Canadian Association was 1,746—increased registration—and I consider that a good sign; 1,750 increased registrations for the past year in our dairy live stock associations; when you consider that that has been going on for four or five years.

Sometimes an agricultural machinery man goes to the farmer and he has to show him that he has a good machine before he will buy, and he has to show him that he will realize a profit by using that machine. The same thing applies to the dairy industry. The dairy associations must bring the value of their produce before the consumer. In other words, we must advertise. A good deal may be done by printers' ink. In doing this we are advertising the mediocre cow with the cow capable of doing much better than the average. The mediocre cow is being sent to the butcher. We are pleased to know that our government is giving the dairy industry some assistance.

In the first place, they are doing much for the owners by introducing a system of cow testing. There is no better way of proving the worth of the dairy cow than by weighing the milk and testing with a Babcock tester, and by means of testing his cows, the farmer can get rid of the robber cow.

In 1906, the Honourable ex-Minister of Agriculture, Sydney Fisher, organized cow testing associations at Cowansville, and before 1906 was closed eighteen cow testing associations were established, with 266 members and over 3,000 cows. In 1911, 188 associations were in existence, with 1,200 members and 11,000 cows. Denmark has been held up to us as an example in that respect. Conditions here are different from those in Denmark. Denmark is a small country where dairying is the principle line of agriculture and where the farmers are close together. Here they are more widely apart, and these dairy associations cannot be operated as successfully, but we are getting to a point where we will be able to operate them successfully.

The government have now established dairy centres. These have been established during the last year, and this year they will have ten or twelve dairy centres with a man in charge of each. The average production of the herds in these centres has been increased all the way from 500 to 2,000 pounds. There are individual herds that have been increased, some 50 per cent and 45 per cent and 100 per cent, and 150 per cent is not uncommon, and some have even gone as high as 300 per cent. For the pure-bred herds, we have a Record of Performance test that was established five years ago, and to-day we have 2,308 cows and heifers entered in that test; 1,800 of these have been entered during the past eighteen months, and already there have been over 400 cows and heifers qualified in that test during the past year.

What will be the outcome of all this and what shall be our work for the future? We must not, as dairymen, depend too much on governmental assistance. We must do something for ourselves, and the owners of pure-bred herds must improve them and cut out the ordinary animals so that they will not have a single cow in the herd that does not come up to the standard. Some people say they do not like to have a standard, but I think there is something in the old Chinese proverb, 'Aim at the sun, and although your arrow may not reach it, yet it will fly higher than if you aimed at anything on a level with yourself.' We must have a high standard and aim to get it.

In stock-judging classes, we are teaching our young men to judge the best kind of dairy cows. There is something better than that, and that is the scale and the bottle, etc., right in the barn. Greater attention must be paid to rearing the calves, and the practice which Dr. Tolmie referred to yesterday of slaughtering the heifer calves where they are sending milk to the cities should be condemned. I say it is almost a sin to slaughter a good dairy calf with a good line of ancestors behind it. Rear up the calf and make your herds better. I thank you, gentlemen, for your kind attention.

Discussion led by Mr. R. S. Stevenson, Ancaster, Ontario.

I am sorry the time is so short, because this dairy business is one of the most important in the country in connection with agriculture. I will just give you a few remarks in the short time I have at my disposal.

The possibilities of the dairy industry in this country are almost unlimited. We are practically only on the edge of dairying. There never was, in the period of our existence, a time when it was better to go into dairying than right now. I do not wish to antagonize the dairy business and the beef business, because we must have beef in this country, but to hear Mr. Gardhouse and some of the other gentlemen say that we are not producing nearly enough beef cattle to supply even our own country is a condition of things that is wrong. When you come to look at the two industries from the financial point of view, there is no question in my mind that the dairy industry is the more profitable. There is one factor in the keeping of beef cattle that we do not have in the dairy business, and that is that the feeding of beef cattle is

largely a speculative business. A man goes out in the fall, as I have done myself, and buys up a bunch of steers to feed during the winter and he does not know what he is going to get for these cattle in May or June.

There is a steadiness about the dairy business that is very attractive, and it is a business that is well adapted to the average farmer. The profit on a beef steer is not very large. I think one gentleman said yesterday he made $17 in Alberta. I think $15 is a fair profit. As I said before, I do not want to antagonize the two businesses because we must have them both, but if conditions will allow you to go into the dairy business, there is no question there is a larger and safer return.

Are we getting out of this dairy business the profit and returns it is capable of giving us? I contend that we are not. I do not think we are getting half as much as we are able to get out of it, and that is largely to be attributed to the fact that we have got too many unprofitable cows. In the province of Ontario—and I do not think the other provinces are any better—we find that the average production is about 3,500 pounds of milk per cow, and the cow that gives that amount will barely pay for her board if the milk is manufactured into butter and you only get 25 cents a pound for it. It would only bring you in about $35 or $40, and I have never been able to feed a dairy cow for less than $35. These 3,500 pound cows must be got rid of. Until a man fixes a high standard for his cows, he will never make the success of the business that he should. Suppose we raise the standard of our cows to 6,000 pounds. The output would be doubled, not by keping more cows, but simply by keeping better cows. We have too many of these robber cows. Our stables are full of them. I like to go into the barn and see the kind of stock a man keeps. Sometimes I find modern stables fitted up with all the latest devices, well ventilated, and everything for the comfort of the cattle, but as I pass along and look at the kind of cattle in them, I often find fifteen or twenty cows with only six or seven that could possibly be profitable to keep. You find the same thing on some farms where they are feeding beef cattle. You will see a bunch of steers, the majority of which would never make any profit for the farmer. We cannot afford to keep these unprofitable animals in these valuable stalls. You can better have a house with a tenant in it who did not pay rent than to have unprofitable cows or steers occupying stalls in your stable, because you do not have to board the non-paying tenant but you have to board the cow or steer that stands in your stall. We must look at these things in a business-like way. We must apply business principles to our farming operations, and I look upon the feeding of live stock as nothing more than a manufacturing business. The manufacturer is always looking for something that will enable him to manufacture his products at a cheaper rate, and if a machine comes out that will enable him to manufacture at slightly reduced cost, he must have that machine. If he does not the other fellow will get it and will be able to undersell him in the market. The feeding of live stock is just as much manufacturing as the making of boots and shoes, and in order to cheapen the cost, we must keep high-class dairy cows or steers, if we are feeding for beef, and we must grow cheap fodder on the farms in the shape of clover, hay, alfalfa and ensilage. It is just as necessary for the farmer to try in every way to reduce the cost of production as it is for the manufacturer, and some of the reasons why we are not getting the profit we should out of the dairy business is that we are not improving our methods, and in the kind of cows we keep.

The first thing we want to do is to weed out the unprofitable cow and then fix on the type of animal that we want and breed towards that type all the time, and by doing that we will accomplish something. If we persist in indiscriminate breeding, crossing backwards and forwards, we will never make a success. There is no man who has ever persisted in that line of breeding that has ever got good results, and it is this cross-breeding of all kinds of live stock, horses, cattle and everything else that is the curse of the live stock industry of this country. We have got to get away from it, and we must fix a good type in our minds and then breed towards that type. I

am not here to advocate any particular breed of cattle. Surely you can get one that will suit your requirements. We have four good breeds of beef cattle and four good breeds of dairy cattle, and after you have chosen your particular breed, stay with it. If you start to grade up by using the Ayrshire, keep on using the Ayrshire and you will accomplish something, and if you start in with the Holstein, keep on with the Holstein, but if you will persist in going backwards and forwards and changing from one breed to the other, then you are making a great mistake. These breeds have been developed for hundreds of years by men who probably forgot more about breeding than either you or I ever knew. It is a folly for any farmer, in his short life time, to think that he can go to work and improve on these breeds by cross-breeding.

You cannot tell very much from looking at the outside of a dairy cow. Her capacities are controlled very largely from the inside. There is no man who can go among a bunch of bulls and pick out one solely from his appearance. He might do it but it would be very largely a matter of chance, and the best way is to look at the record of his dam. There is a prejudice among farmers against an old bull because they think he will be cross. It is not necessary for a bull to be cross simply because he is old. As far as I am concerned, I think all bulls are cross, and if you follow it up you will find that it is the quiet fellow that does the damage. No bull should be led out without a staff attached to the ring on his nose. It is through carelessness that accidents occur. Never trust any bull. In an old bull you have the advantage of knowing the kind of stock you will get.

I do not believe the live stock of this country are as good and vigorous and strong in constitution as they were twenty-five years ago, and I think it is very largely due to the fact that the breeders have not been using old stock. When a farmer goes to buy a bull, he will invariably buy one two years old. I think we can very well take a leaf out of nature's book. There is no domestic animal we have ever had that has done more for the farmers of Ontario than the old dairy cow, and there is no other animal that you can give an extra feed of grain to one day and she will give it back to you in the pail the next. Take away the dairy cow and you take more away from your table than you do by taking away any other animal on your farm. What would our tables be without butter and cheese and milk and cream. There is no animal that has done more for the country than the good old dairy cow.

Something was said by Mr. Gardhouse about the general purpose cow. The general purpose cow is all right if you can get her, but the great difficulty in this country is how are you going to breed her with any degree of certainty. Suppose you have a good general purpose cow, where are you going to get a bull to mate with her that will probably be just as good as she is. That is the difficulty you are up against. I think it would be better to put beef on one side, and go in for the dairy cow. We hear a great deal about tuberculosis, and Dr. Rutherford gave us a splendid talk on that subject last night. That is a matter that we have got to look out for, and I know that he is perfectly right in what he says, and there is a great deal more of it in this country than any person thinks.

I would like to say a little about tests. I would not advise you to buy a bull from a cow that has only made a one week's test. I am not here to speak against the week test, because it is very valuable as far as it goes, but we must have a longer test. It is the persistent milker that we need in our business; that is the cow that is giving from six to eight or twelve thousand pounds of milk in the year. It is not the cow that comes in with a great flow of milk and is dry in three months that we want for the dairy business. We want, as I said before, the persistent milker. I would like to talk longer about this question, but I see you are getting impatient and I thank you for having given me such a kind hearing.

FIFTH SESSION.

THE DEVELOPMENT OF THE SHEEP INDUSTRY IN CANADA.

John Campbell, Woodville, Ont.

This line of husbandry is one which has been losing ground in Canada during a number of years past, as shown by the decrease, according to available statistics. It is admitted by a very large majority of agriculturists that a flock on the farm is both useful and profitable, in more ways than one. Directly, as producing more income, according to capital invested and the labour required, sheep are held in high favour by those who know of their good qualities. Indirectly, the flock is in favour, because of its place as a weed-destroyer, and of its ability to gather a large portion of its living from grass growing in nooks and corners which would otherwise be wasted.

How would we fare without wool for our clothing, and the best of meats—lamb—for our tables?

And yet, with such convincing facts constantly before us, sheep-breeding for the common markets has been gradually declining. We may well carefully consider what shall be the ultimate results if the discarding of flocks be continued. and what the rewards, if any, of making the raising of lambs for the market part of the business on every well-regulated farm.

According to the old saying, "to know a fault is half the cure,' but there is another proverb equally true, which is 'that none are so blind as those who will not see.' The question to be discussed now is how can this industry be more fully developed? According to hearsay, some of the hindrances in the way are dogs, coyotes, want of proper fencing, and the old-time dangerous cry, 'they are hard on grass.'

Is it not humiliating for man to allow dogs drive him out, or keep him out, of a pleasing and profitable business. Need it be so when a five dollar bill and a few hours' time will provide a moveable enclosure, where the flock may be safe-guarded at night in the pasture field and the owner rest unconcerned from dark till daylight.

Coyotes are disappearing and will soon be forgotten. In the western provinces, wires, strung on posts, kept horses and cattle in bounds, but, as a means to restrain sheep, they were useless. That hindrance to sheep husbandry is being removed as the woven wire fence is coming more and more into use. The determination to make sheep-proof fences, was heard frequently expressed at the winter fair in Brandon, Man., in 1910. Meeting at Toronto recently with several whose acquaintanceship was formed at Brandon Fair, it was pleasing to learn that flocks of sheep have been lately added to their farm equipments.

In dealing with the dairymen's contention, regarding their dislike to sheep, it is safe to surmise that it is treading on thin ice. But we must take facts as reported on good authority.

That the average dairy cow does not pay for its keep has been, and still is, a standard saying at conventions, institute meetings and such like. It was heard at a meeting two weeks ago, when stated in another form by a gentleman who has a very excellent and highly profitable stable of dairy cattle. The inference must be that dairying, as a whole, is not by any means so profitable a line of business as we are asked often to believe. The average is merely a summing up of the whole, and if the average is below a profitable standard, the whole must be on a similar level.

Travelling on a train last month with one of our Dominion Government's cow-testing officials. he gave us the information that he found dairy cows costing $41 annually for maintainance, producing not more than 3,000 pounds of milk during the

same period. It so happens that this month, for the first time in our country's history, we are able to get official figures regarding the cost and returns from small flocks of grade ewes at widely separated points in Ontario where nine illustration flocks have been under test by the Ontario Department of Agriculture. The nine flocks' cost for maintainance during the year was $798.14. The total receipts, consisting of wool and finished market lambs, amounted to $1,167.53, furnishing a balance of profit of $369.39, or 46 per cent of cost as the share of profit. The profit on capital invested was 40 per cent. The best-doing flock gave on investment 71 per cent; the lowest in profit flock gave 9½ per cent, and one flock which was unfortunate in having a loss of two ewes and the ram at head of flock—values of losses deducted—still made a clear profit on investment of 17¾ per cent.

It may be stated that the year was not nearly so favourable in prices realized for the finished lambs as any of several former years would have been. It was not up to the average.

It is strange, but to a very marked extent true, that if any statement is repeated often enough, he who utters it, and they who listen, believe it to be true, though in reality it is far from being correct.

On the other hand let us notice how any new or old line of production, which people use and are the better for using, finds its place and market. It is not sufficient to have, for the public, the superior article produced. We must let the public know that we have such within their reach and use every lawful endeavour to convince the people that they can have more healthful and comfortable and, therefore, happier living by using the commodity we wish to promote.

To a large extent, the way is already paved to the profitable markets for our flock's productions. The failure and blame rest greatly with the Canadian producer in the case under consideration.

The demand from east to west, but especially in Ontario, is increasing more rapidly than the supply. It is not creditable to us that we have not supplied our own people during the past three or four years with all the mutton and lamb required for home consumption. To develop the industry and so stimulate it as to meet the demand fully, we must make known, and that in a convincing manner, the profits directly and indirectly which are nearly absolutely certain to result from the flock on the ordinary farm, cared for in a reasonable manner and given but a small share of the attention required in other lines of live stock husbandry. It may be necessary, in order to convince the many, to spend considerable in the way of educating the indifferent, as to the possibilities of the industry. Our Ontario department spent freely in promoting the bacon hog industry with, on the whole, very gratifying results. It spends annually in promoting the dairy industry no less a sum than $100,000, with results as already stated. It is high time for our governments, federal and provincial, to aid liberally, in some way, the production of meats from our flocks, and also our herds, if our workers—the makers of our great country— are to have their just share of table necessities.

We need more and better flocks. People generally stand ready to be so convinced if not yet fully aware of existing conditions. We must be ever ready to talk sheep up and not down. Tell the good story of the great benefit and possible success of the flock on the farm. Then repeat and repeat and repeat the truths, until the ones who should know cannot help knowing the good which may be got with such comparative ease and with so small an outlay. This is an age of advertising. Our agricultural departments must be held responsible for any lack on their part to spread truths of which they are cognizant, truths which, if made widely and freely known, cannot fail in benefiting the country at large.

Our Dominion Department of Agriculture, with the able leadership of Dr. Rutherford, our Live Stock Commissioner, has been active in recent years along the lines of interprovincial trading and also in appointing a commission to investigate

conditions in favour of, and those hindering, development. Such efforts, if followed by a spreading abroad of the knowledge gained, will surely result in turning the attention of the general farmer to that which is in his favour.

That we have in Canada, and especially in Ontario, all the requirements necessary to make sheep-breeding equally or more successful than is possible in other lands, has been clearly demonstrated by the owners of pure-bred flocks, who have again and again led with their flock's productions at world's fairs and international exhibitions.

So prominent are such successes in the minds of our American friends to the south, that some of their agricultural college professors and students are making a special study of individual flocks in Ontario at the present time.

Having such indisputable facts to reason from, there is no need for delay in putting forth all possible legitimate efforts in compelling the farming public to give due consideration to an industry which is certain to have a beneficial and comforting bearing on their personal and financial welfare.

That compelling, which will surely develop the business, can only be done somewhat in the manner of successful departmental stores. They advertise freely. We have had it proved to us without doubt, that the best of quality can be produced in our Dominion. We have the consumers who are prepared to use more, considerably more, than we are now producing, and that at a highly profitable price to the breeders. The endeavour then should be, and must be, to enlist the energies of our agriculturists to find a place on practically every farm for a profitable flock of sheep.

SHEEP IN CANADA—1907 TO 1911.

—	1911.	1910.	1909.	1908.	1907.
Prince Edward Island	108,600	110,599	109,244	113,206	110,986
Nova Scotia	351,000	358,263	361,444	373,392	384,940
New Brunswick	190,800	203,620	215,289	230,502	250,546
Quebec	533,400	549,068	570,342	600,992	626,033
Ontario	975,400	1,032,227	1,118,945	1,205,630	1,106,183
Manitoba	29,600	30,266	29,074	29,265	.....
Saskatchewan	111,300	185,360	129,630	116,438	.....
Alberta	179,200	179,067	171,422	161,979	.....
British Columbia	.....	.....	.....	.....	.....
Canada	2,389,300	2,598,470	2,705,390	2,831,404	.....

DISCUSSION OF SHEEP INDUSTRY.

Led by W. T. Ritch, Department of Agriculture, Ottawa.

It is only an hour since I heard that Mr. Dryden was not likely to be here, and some of the points that Mr. Campbell referred to are those to which Mr. Dryden gave special attention, and I am sure he would have had something interesting to tell you.

Mr. Campbell referred to our report and I am very pleased to know that it has been favourably received. Some people make the great mistake of looking at what a report says about their own province and not paying any attention to the rest of it, and I hope you will not do that in this report. There is much in it that will be of interest to every province, and there is considerable information in it that may be new to you and something that you may possibly turn to account. If you are disappointed with the sheep industry in your own province, do not throw the report away, but go over it carefully and I am sure you will profit by doing so.

According to what Mr. Campbell says, one of the chief excuses for not going into sheep is the dog question. I regret that we did not give the dairying side of the sheep industry special attention. In Great Britain a number of sheep are kept on dairy farms, and I know they are kept on dairy farms in other countries and I know that they pay. If business leads me to visit the old country this summer, I intend to look into that question thoroughly. It is a mistake to think that one of the chief reasons that sheep have been a failure in this country is because of dogs. Some people have an idea that sheep require no attention, but they never made a greater mistake. They require attention just as much as any other kind of live stock, and wherever we find sheep getting as much attention as other live stock, we have always found that these farmers are the most intelligent and the most successful. I never yet found a successful sheep man who was a poor farmer. Whenever you see a man who is successful with sheep, look at his buildings and see how tidy they are, and his fence corners and how clear they are of weeds, and his crops generally, how well they look. Sheep require less capital and less labour than other live stock. A great complaint in the eastern part of Canada is that the young people leave the farm and only the old people are left. That is one of the chief reasons why sheep-raising should be more popular. A man may be getting old and infirm and the young people may have left him, and he may not be able to go into the stable and look after the horses and steers, but he must be very old and very infirm if he cannot look after a few harmless sheep, and considering the amount of labour necessary, he is more independent of hired help than in any other line of live stock.

Another excuse that is made for the decline in sheep-raising is the low price of wool. Wool should not have the first consideration in the raising of mutton sheep, but if you are raising merinos, then wool must have the first consideration. The wool of a mutton sheep is only worth $2 or $2.50 under the best market conditions, and it is a very poor sheep that is not worth $5 or $6. If you look into the figures carefully, you will find that sheep will pay you better in proportion to the capital invested than any other branch of live stock, even if you grow no wool at all. You must not expect to get the high price for the wool of mutton sheep that you were accustomed to get twenty years ago. A new kind of wool has taken the place of the old kind; fashions have changed; the price of manufacturing wool has changed. Twenty years ago, we heard very little about freezing mutton and there was very little thought of the lamb trade, but to-day the lamb trade is an important one and the frozen mutton trade is enormous.

The production of frozen mutton means cross-breeding, and the production of the cross-bred wool completely revolutionized everything, and it has continued to hold the first place in the market. We are not going to be satisfied with the prices we are getting for wool. It ought to be 40 per cent more than we are getting, and I hope that in a very few years we will get what we should. The price of mutton has steadily increased every year and the number of sheep has steadily declined. The Maritime Provinces not only have a local trade, but they have on export trade with the New England States, which is their chief market. In 1905, the price of mutton was from 2 cents to 2½ cents a pound live weight, and Prince Edward Island, at that time, had 125,364 sheep. In 1907, the price was 4½ cents to 5 cents a pound live weight; in 1909, 4½ cents to 5¼ cents; in 1910, 5 cents to 5½ cents, and the sheep population in 1909 was only 79,470, and in 1910, 75,100; the number of sheep less than half and the price of mutton more than double. The other Maritime Provinces tell the same tale as Prince Edward Island.

I should like to hear a discussion on the growing of feed for sheep during the winter months and the best way to feed them. That is a subject that should be taken up in the Maritime Provinces. Neglecting to dip is another serious thing. With the exception of a few breeders of pure-bred sheep, dipping is neglected, and it is impossible to compete with other countries in wool if we neglect dipping, because

they find it absolutely necessary to dip twice a year and we will have to do the same. I hope some scheme will be devised whereby the small farmer with a small flock will be able to dip conveniently and satisfactorily by having some system of co-operation. Nine or ten small farmers who live close together could invest in one first-class dipping outfit and drive their sheep every season to that particular farm where the dipping plant was located, and they could pay the farmer 2 cents or 3 cents per sheep for the trouble of looking after the dipping. That system has been found very satisfactory in certain districts in Scotland and Wales and Ireland. The difficulty of washing sheep before shearing is well known in Canada. The streams are cold at the time the sheep are shorn, and if there were a large dipping tank filled with water and soda and some soft soap, and a few pails of hot water to take off the chill, that difficulty would be overcome.

We have not got to the stage of cross-breeding in Canada yet. The cross-breeding that has been done has not been very good. There is no scientific system. I hope to be in the west next month and go into the ranch question. The price of the different breeds of sheep is a big question to go into but is is a very important one. We should try to have each district confine itself to one particular breed of sheep. Suggestions have come from the Maritime Provinces during the last fortnight of a very feasible plan which I hope to bring to the attention of the Live Stock Commissioner this week, and I hope that by October it will be decided which breed is most suitable for the district so as to have one breed in each locality. Three years from now, I hope we will have all one type in certain districts.

Professor GRISDALE.—I have listened with a great deal of interest to Mr. Campbell and to Mr. Ritch on this sheep question. Mr. Campbell made reference to the lack of work on the part of the government to help this industry, and in some measure he is correct in saying that there has not been sufficient attention given to this matter by both the Dominion and Provincial governments. We are trying to do something to help this industry on our experimental farms. I have been interested in the sheep-breeding industry in Canada for a number of years, and it always seemed to me that one of the principle drawbacks to the sheep industry was the low price which many of our farmers are compelled to take for the lambs in the fall when the great majority of the lambs are put on the market. It is a surprise to me that more farmers do not carry them over.

Three years ago we undertook some experimental work at Ottawa in feeding lambs in three ways—one group on roots, one on corn ensilage and the other on a mixture of corn ensilage and roots. The results were satisfactory and showed considerably over a dollar a head profit after paying for all the feed and care, and paying the highest market price in the fall for our lambs. We did the same thing last year with equally satisfactory results, and we are doing it again this year.

I have decided to undertake experiments similar to this on various other farms, and we have under experiment at Lethbridge, in Alberta, 250 lambs which we are feeding in four or five different ways. We have about 100 at Indian Head, and over 100 at Brandon, and a number at Agassiz, and a number at Nappan, and thirty on the island. We are trying to find out the cheapest way of feeding them and the foods best suited for lambs. It seems to me that it would pay the sheep breeders to bend their energies in the direction of extending our markets for lambs and not confine themselves to the months of August, September, November and December. It is difficult to get lambs, especially in this part of the country, ready for the Easter market, and it is also difficult to get them ready for the June market, but I think we could extend the market, and if we can, it will give a great impetus to this sheep-breeding industry.

We had no difficulty in keeping our sheep through the winter, and they ate up a lot of feed that, in many cases, would hardly have been consumed by other stock, and certainly would not have been consumed by any other class to greater advantage, not even by the dairy cow.

We are doing all we can at the experimental farm and we hope to increase our flocks. I believe sheep will be one of the chief factors in clearing up the weeds which pollute many of our western farms. The sheep industry is bound to take a prominent place in the west, and we are doing all we can on three of the farms there to help them along.

Dr. RUTHERFORD.—I have listened with a great deal of interest to the discussion on the sheep industry, and I would like to express my very deep sense of the tremendous importance of the agriculture of Canada of a speedy and comprehensive development in every province of the sheep industry. There is no question at all that sheep can do more in the way of preserving and restoring the fertility in the soil than any other of the varieties of our domestic animals. At a minimum cost, great profits can be secured from the keeping of sheep, and there is no province in the Dominion that has anything like the number of sheep which it ought to maintain. I think the country owes a debt of gratitude to Messrs. Dryden and Ritch for the excellent report they have made on the sheep industry.

I studied for a good many years endeavouring to stimulate a public interest in the sheep industry, and I finally found that a good deal of the hesitation and of the disinclination of the people to go in for sheep was due largely to the misunderstanding of the wool side of the question. Read the report.

You cannot study it and understand it and digest it in a day or in a couple of days, but if you will study the report you will begin to see light on the question, particularly on the wool side of the sheep question.

I have hung up a little picture above this dairy cow—you will notice I did not put it below. It is the picture of the 'wether' of Mr. Lloyd Jones to which allusion was made. That 'wether' was champion at Chicago and is occupying a position of prominence in the picture gallery of this convention.

MARKET FOR CANADIAN HORSES.

Herbert Smith, Esq., Union Stock Yards, Toronto, Ontario.

I have been invited by the Executive Committee to make a few remarks on the 'Market for Canadian Horses.' I might answer this question in a very few words by stating that our market will be in the Dominion of Canada for the next twenty years. Now, gentlemen, there is no religion or politics in what I am going to say, and should I say anything that does not agree with your opinions, don't take it to heart, for we are all here in the same interests and for the sole purpose of trying to make some suggestions that will improve the agricultural conditions of this great Dominion of ours. There have been a number of statements given, and I think I am quite in order when I make the statement that there is no place in this country where a man has a better opportunity of learning the requirements of the horse market than on the floor of a horse sale ring, where one is continually meeting people from all quarters of the globe. Therefore, from my experience, I am going to tell you what I think is wanted to improve the horse industry and what the general trade wants. First, I would like to go back a few years and tell you that I have seen numbers of American buyers right on our market buying and shipping load after load of choice stock across the border. I have seen English buyers come here and buy from one to five and six carloads of the very finest coach horses suitable to be shipped to European markets and bring the highest prices for all kinds of work, busses, trammers, job work, coaching or saddlers. Where are the stallions and mares that bred this stock now? I tell you, gentlemen, they are practically extinct in this country to-day. These were clean boned horses of the carriage and saddle type, standing from fifteen two to sixteen hands and were sold from $185 to $225 per head, and I venture to say

it would be next to impossible to pick up one carload in Ontario to-day even at a much higher price. Speaking of saddle horses, we have heard a lot about the breeding of horses and the placing of stallions for remounts for the army. This is a move in the right direction, for we must protect our country, but it is a matter for the government to figure out on their own account.

Now, if not out of order, I have a few suggestions I would like to give for your consideration in regard to army remounts. I know, and you all know, that the price offered to-day for good saddlers suitable for army purposes is so far below the cost of production that breeders of light horses will not take a chance. With our wonderful climatic conditions and limestone formations in Ontario, which have a tendency to give horses the very finest quality of bone and sinew, this is the province to breed army remounts in, and I might also add that it is freer of contagious diseases than any other country—thanks to our Veterinary Director General. I am going to suggest that the Dominion government make a beginning at once by securing, say, one thousand of acres of land and start a remount depot. In connection with this—and here is where the Department of Agriculture may do something practical in addition to what has been done. I would suggest that a schedule be established, by the government, of prices which they would agree to pay for suitably bred horses for military purposes at any age, say $65 for yearlings, $100 for two year olds, $135 for three year olds, $170 for four year olds and the top price for five year olds, all subject to inspection. These could be purchased in all parts of the province and shipped to headquarters, where they could be trained and conditioned for service. The benefits to be derived from this course would include the following,—Farmers who now feel unable to breed their mares, fearing they may find they are short of feed, would not hesitate to breed every mare, knowing they would have a market for every head at any age, and if they were able to keep their horses until matured, might either sell to the government or to buyers of saddle horses, whichever they found most profitable. Our annual camps would soon be able to have at least two or three well horsed cavalry regiments, which would be a credit to Canada, instead of the bunch of three-cornered skates, which are hired every year for training purposes, making it impossible for the officers or men to do credit to the service, the great difficulty in hiring horses making it often necessary to have everything from a polo pony to a heavy draught horse in the same troop. The money now used to hire these horses would go a long way towards paying for the feeding of first-class suitable horses. Then men would enjoy the service more and many difficulties would be overcome.

Then comes the benefit in the future. We would become recognized as being great breeders of saddle horses and cavalry horses, if this system were put in practice at once. As soon as we arrived at a point where we had a number of horses ready for service, we should undoubtedly be allowed an annual subsidy from the Imperial government for first call on these horses in case of requirement, at a fixed price per head. This would also go towards defraying the expenses of such a remount station.

The market for Canadian horses to-day, taking into consideration the inroads the auto is making in the sale of the carriage horse, can be summed up as follows:—Ponies, saddle horses, city delivery horses and heavy draughts. I might mention that I am not representing any particular breed of horse when I make this statement, because when they come on the market to be sold they are all the same to me.

We have heard a number of very elegant speeches about the conditions in all branches of live stock, and so far have heard but very few suggestions as to a remedy. The foundation of all the agricultural interests is the draught horse, because he has to break the land to grow fodder to feed himself and all his kindred, and this is the breed we must look to to-day to meet the requirements of our vast northern and northwestern provinces.

The Canadian market to-day demands a heavier, cleaner-boned horse with more quality. I am going to make another suggestion. It is a well-known fact that the

quality and supply of draught horses is diminishing every day, and strenuous efforts must be made, and made at once, to bring back what we once had.—draught horses fit to ship to any market in the world.

The great Canadian Northwest Territory is practically an undeveloped empire with almost unlimited agricultural possibilities. The most fertile wheat lands on the continent are on this zone awaiting development, and when improved will produce annually hundreds of millions of bushels of the gluten cereal for domestic consumption and exportation to Europe. With wheat nominally stationary at $1 per bushel there is no business that offers greater financial inducements than exploiting the virgin wheat lands of the Canadian Northwest. This vast domain cannot be redeemed from virgin wilderness into cultivated farm land without the aid of horses and modern agricultural machinery. As the Canadian Northwest has developed a new and immense market for farming implements, so also has it created a marvellous demand for horses as motive power in agricultural operations. Buyers and dealers have been in Chicago markets in great numbers executing orders for carloads of horses for shipment to the undeveloped wheat lands of Canada. During the spring session of the market, train loads of farm chunks were purchased for consignment to the fertile agricultural lands of the northwest.

The mineral interests of our Dominion, we all agree, are wonderful and will eventually take care of themselves, but in the meantime the government is giving bounties to encourage the manufacture of a number of the products, such as pig iron, steel, etc., and at the same time neglecting the very animal that is the foundation of all our interests and one that has brought our Dominion, and especially Ontario, to the front as the banner breeding province of, I might say, America. This has all been done by private enterprise, with no help in any way from our government. I see by the papers, in the speech from the throne at the opening of the Ontario parliament, that the Dominion government are going to give substantial aid to the agricultural interests, and I suggest that some plan be adopted whereby there can be given a bounty on the imports of heavy draught mares. This is not asking much in the interests of the horse and could be carried out in some such manner as this,—the mares to be up to a certain standard, quality and weight, and to stay for a certain length of time in the province into which they were imported. The details of this suggestion could be worked out by the heavy draught societies and recommendations made to the governments, provincial or otherwise. I would also recommend the inspection of stallions, but, as Mr. William Smith is going to take up this subject, we will look for something practical from him.

I might say that for years to come there will be more money made by breeding heavy horses than in any other branch of the live stock industry.

From now on, our motto on the horse question must be, if we want to stay in the business, give the people what they want, and that is cleaner-boned, heavier horses with more quality, and more of them. Bounty the mares, inspect the stallions, and then probably, in five or ten years, if action is taken at once, we may have a surplus and take a hand in the export trade again, the same as we did a few years ago.

Discussion led by W. J. Langton, Esq., Superintendent Dominion Transport Company, Toronto, Ontario.

One thing Mr. Smith mentioned was the amalgamation of the Clyde and Shire. I think that would be a very wrong thing to do in the interest of heavy horses in this country. In going through the country buying horses, we often see stallions that would be much better if they were put into a cart to haul coal. Another thing I notice is the small cooped-up stables not properly ventilated or cleaned out. Horses from such stables very often bring disease with them. Sometime ago it was distinctly understood or proposed that there would be an inspection of stallions, and I think that matter ought to be brought before this body to deliberate on.

Then again we have the shoeing question. Many farmers in sending a colt to the market will go to the nearest blacksmith shop and have clamped on a pair of shoes that should be worn by a light driver instead of putting on a new set of shoes of proper weight, the same as he would when sending his children to church or Sunday school. Some years ago the electric cars were supposed to take the place of horses, but we find it more trouble than ever to get good horses. Motor trucks are not practicable in this country, especially in the cities where the lanes are so narrow. Therefore, the draft horse is here to stay, and I think the farmers ought to be encouraged by the government to raise good draft horses. A prize should be given at all agricultural fairs for shoeing horses. That is done in the old country and has met with good results. We are badly in need of general purpose and express horses in this country, but Mr. Smith has already referred to that and I will not occupy your time any longer. I hope we will all go away from here reaping benefits from the remarks we have heard.

STALLION LEGISLATION.

William Smith, M.P., Columbus, Ontario.

The subject with which my name is coupled has been discussed upon so many occasions and at so many different kinds of gatherings from one end of the province to the other that it seems to a certain extent a hackneyed question. As long ago as twenty years, it was a live question in the province of Manitoba, and the Live Stock Commissioner for Canada introduced a measure in the Manitoba legislature dealing with this question. He commenced in these early years to lay the foundation work which he is carrying on to-day and for which, I believe, every live stock man in Canada is prepared to give him all the credit that is due him.

It has been a live question in some of the other provinces in Canada. It is a live question in Scotland, although they do not license stallions there. The Scotch people are so careful of the work they are engaged in, that it practically amounts to licensing. Belgium is following the same lines and France is quite as careful as any country that I know of, and in many of the States of the Union, action has been taken with regard to licensing. Our ideal should be for the protection of the very best, and that should be true of everything that is raised upon the farm, but especially should it be true of horses,—the best and purest bred and the best conformation that it is possible to have. My own opinion is that we should do something in the way of licensing, and we should do away with the grade stallion. I agree with Professor Cumming when he said here ye-terday, 'We must suppress the scrub stallion.' How is that to be accomplished? Are we, year after year, to try to educate the people to that point or must there be some stringent measure taken? My own idea is this: You may go on year after year talking, but it will take a long time, away back in our country, in the new parts, to educate the people up to the point where they will do away with the scrub.

We tried to introduce a measure into the legislature at Toronto, and it was so mild that it hindered no one from using or travelling a stallion; the only thing about it was that the parties using that stallion would know more about it than they ordinarily do, and yet we could not get that bill through.

My idea in licensing would be that we should only use the pure breeds. It is true difficulties may arise. We will be told that there are grade stallions that are equally as good breeders as the pure breeds. That may be partially true, but it will only be true of the first cross, and if we try to continue on the work we do not know where we will land. If like will produce like, then there is only one safe rule to follow, and that is to only use the best pure-bred animal we can get. If that be the case, if we license stallions, the grade stallion will finally disappear altogether and that would

be one of the wisest things to do. It would be a great thing for Canada if by licensing, we could accomplish that purpose. There is no doubt objections will be taken, and that is true of almost every law that is placed upon the statute books of our country. It might take a little nerve to make the law, but I am quite satisfied that before many years public opinion will be strongly in its favour and the men who would object to it at first would be its strongest adherents in the end. That being the case, I think it is wise that we should take into consideration the examples that we have from other countries where they have accomplished so much. Scotland, France, Belgium, and even Australia, have been moving in this direction. I do not see any way of doing away with the scrub or the grade stallion unless the law steps in and says that at a certain time they cannot have any place in our country.

I do not say that in licensing we should be extreme at the outset, but we should gradually work up to it, and we should do away with the grade step by step and gradually make the licensing more stringent in every possible way. If we do that now, the generations that come after us will rise up and bless the men who placed upon the statute books of our country such a law as I have briefly described.

I think it would be wise for this convention to state in no uncertain tone in a resolution, something on the lines I have spoken of. The attention of the people of the country may be drawn to the fact that we are moving on these lines, and then, perhaps, we could see on the horizon some little light glimmering, leading to the point I have spoken of here this afternoon.

Discussion led by Mr. Andrew Graham.

I have only a few words to say. I had a letter from Dr. Bell, who was to have led this discussion, stating that on account of a severe illness he would not be able to be here. We passed a Stallion Enrolment Act some years ago and it has worked very well as far as it goes. It requires all parties handling stallions to enrol them every year with the Department of Agriculture. If it is a grade stallion, it is enrolled as a grade stallion and the fee is 35 cents. If it is a cross-bred stallion, the certificate must show that he is a cross-bred, and if of a pure breed, the certificate shows that he is a pure-bred stallion. In order to pass as a pure-bred stallion, he must be registered in the records at Ottawa. That law is very good as far as it goes, but the grade stallion still continues to be used, and the owners even take these certificates of enrolment and pass them off as pedigrees on a lot of people.

The horsemen prepared a bill and it was taken to the legislature and it passed its first and second reading, but some members of the legislature thought it was a little too drastic and they referred it back to the agricultural societies. The bill was brought up at the Horse Breeders' Association and they altered it. The first clause asked that all grade stallions be eliminated from service and that met with general approval of the Horse Breeders' Association. That law was to come in force in 1914. Some of the clauses regarding soundness were rejected and other clauses inserted in their places. The bill requires a horse to be perfectly sound, and the agricultural societies throughout the country are all in favour of this bill. If any of you gentlemen have not seen a copy of it, you should secure one. It is called Bill No. 16 of the Province of Manitoba.

Dr. RUTHERFORD.—This is a subject in which I have for a great many years taken a deep personal interest. As Mr. Smith mentioned, I claim to be the originator of legislation of this kind in the Dominion of Canada. In the year 1893, when I was a member of the legislature of Manitoba, I introduced and was successful in having placed on the statute book of that province the first Act governing registration and licensing of stallions. It was somewhat of a rudimentary measure.

I was very much struck with the remark Mr. Andrew Graham used just now when he said that this draft bill, which is undoubtedly the most drastic and thorough-

going piece of legislation of its kind which has ever been presented in any legislative body in Canada, has received the unanimous endorsation of the agricultural societies of the province of Manitoba. That shows more clearly than anything that ever came under my observation the advisability of going slow at the beginning in the introduction of reforms. In other words, get the thin end of the wedge in first. It is true that the patrons of industry and organizations of that kind were at the zenith of their political power in 1893, and some of the members of the Agricultural Committee were terrorized because it was looked upon as class legislation, and if it had not been for my friend, Bob O'Malley, bursting out with the expression: 'The doctor is quite right. I would sooner have a blizzard strike my farm than one of these scrub stallions,' I do not know that I would have succeeded in getting that bill through.

It has been a matter of constant wonderment to me that a province such as Ontario, in which reside all the leading horse breeders of the Dominion, men who have made the Dominion famous for its horses, has been content to lag along twenty years behind the little postage stamp province of Manitoba which, fortunately, is now a postage stamp no longer. The Ontario Department of Agriculture appointed a commission which did a very great deal of research work, with the result that figures were made available, and by using these figures I showed in a paper that I read last year before the Ontario Fairs Association that wherever you got the largest percentage of pure-bred stallions they were producing the right class of stock, and the districts in which these horses travelled were primarily the horse-breeding districts of the province, and that on the other hand, the backward counties were those in which there was a preponderance of stallions of the scrub variety.

These are the facts and figures, anybody can see them, and yet this intelligent centre of the breeding industry in all classes of live stock, particularly horse-breeding, continues to go on in the same old way perpetuating this folly which will keep back and retard the horse-breeding industry for years to come, until some action is taken.

I do sincerely trust that the Committee on Resolutions has not overlooked this matter, and that this convention of the National Live Stock Association will speak out with no uncertain sound on this great question so as to stiffen the backs of the Ontario legislators and make them see the light and follow the example of the western provinces, by passing such stallion legislation as will place the horse-breeding industry of that province on a good sound and proper footing.

TRANSPORTATION OF LIVE STOCK.

Peter White, K.C., Pembroke, Ont.

I am sailing under false colours to-day. I am misrepresented before you as one who is able to speak upon the question of transportation of live stock with that degree of knowledge which you might expect from a gentleman whose name is down on the programme. I must ask you to bear with the very inefficient substitute which has been provided while I endeavour to speak a few words on this important question, which is a very live issue in railway matters and in live stock matters in the Dominion of Canada.

In the early days of transportation, the railway was the rival of the horse, and at that time the railway was going to put the horse and the ox out of business. Of course, the horse and the ox still survive, and I am glad to say in ever increasing numbers and quality. In the early days of railways, nobody ever thought of shipping live stock by railway, and it was not until 1858 that it was possible to do so. In that year there were some live stock shipped on one or two of our English railways, and from that time to this persons who have been endeavouring to ship live stock over

railways have had to go to the railway companies and almost on bended knee, beg them to take their live stock for transport from one place to another. I wish to place this matter before you as clearly as I can. The railway companies are and always have been, with certain limitations, insurers, that is to say, if you give a bale of goods to a railway company for shipment from the City of Ottawa to the City of Winnipeg, that railway company is bound to ship these goods to Winnipeg and deliver them to the consignee there or pay you the full value of the goods. That has never been the law in regard to live stock, and it will be quite apparent to any of you who stop to consider that that would be a very unreasonable state of affairs if the railway companies were asked to do that, because there is in live stock what there is not in dead freight, that quality which enables it to move itself and which railway companies call 'Inherent vice.' Inherent vice to the railway companies is the very thing which makes these animals valuable to us.

There are four documents governing the shipment of live stock on Canadian railways. First, you are asked to sign a special live stock contract, and that contract contains certain terms and provisos and conditions under which your stock is shipped. In addition to that there is what is called the 'tariff,' which sets out in detail the amount which you are required to pay for the transport of each class of animal from one point to the other, classified according to the distance to be transported. Curiously enough they have found it necessary to attach to the price certain conditions upon which you can ship these goods at certain prices, and other conditions upon which you can ship them at a certain other price. Then there is what is called a 'classification,' and that classification is something—to use an old hackneyed illustration—that you can fall down and worship without committing idolatry, because there was never in the heavens above or the earth beneath or the waters under the earth, anything like it. It is fearfully and wonderfully made. The fourth document is what is called the 'regulations' and, strange to say, these regulations are more unfavourable to the railway companies than favourable to them, and an application is now being made, I believe, to make them a little more unfavourable, with every hope of success. These are the four documents which govern a single shipment of live stock, and I suppose hardly any of us have ever stopped for a moment to consider that when we place a horse or cow or sheep or pig upon a freight train or in an express car in this country, we are virtually signing documents which are more complicated in their form, much more lengthy, much more difficult to construe, than a conveyance involving a transfer of land, perhaps, worth millions of dollars, but that is the exact position.

When the present Board of Railway Commission took office, they found that certain forms of railway contracts were in use and, holus-bolus, they adopted them merely for the sake of convenience. There has been considerable difficulty about live stock contracts, and for reasons best known to itself, and no doubt due to representations which have been made to it, the board of its own motion has asked the railway companies to submit a new special live stock contract, which they did, and in doing so they evidently forgot that things had taken a slight change in the Dominion of Canada. It must have been a rude shock to the railway companies, which are carefully organized and skilfully adivsed, as they are, to find opposing them in this matter an organization as good as their own. I won't say anything about the advice that organization has got, perhaps results will speak for themselves. To make a long story short, the reason that the railway companies have been able to foist upon the shipping public of this country, a contract which on the face of it is an unreasonable document—a child reading that document could come to no other conclusion—is that they were skilfully and highly organized, while the live stock men had no organization to meet them and, consequently, had no influence. There was no way of having concerted action and there was no person whose business it was to take this matter up, but largely owing to certain members of the Canadian Manufacturers' Associa-

tion—and I may say to you that I think in this matter that we owe the Canadian Manufacturers' Association a debt of gratitude, because they have pointed out to us a way through which we may be able to get reasonable conditions from the railway companies or from the Board of Railway Commissioners of Canada, for the shipment of live stock—they have placed at our disposal the services of their experts. The assistance and technical knowledge of these gentlemen on this question has made it possible for Mr. Cowan and myself to take this matter in charge and prepare our brief, and we have been able to meet the railway companies' traffic experts face to face and upon equal and even ground, and it gives me pleasure to have this opportunity of testifying to the great advantage it has been to be associated with these gentlemen in this matter.

There are many features of this question which might be discussed. I might point out one matter in the classification: there are two rates, so called, for the shipment of live stock. There is the higher rate, so called, although we have refused to admit these terms by which, when you ship an animal and pay according to that rate, that animal is shipped at the risk of the carrier. When you pay the lower rate, then your animal is shipped at your own risk absolutely and entirely. When you want to ship an animal from Toronto to Montreal, and you think that the railway company ought to assume the risk of carriage, that is a matter not in the contract at all but in the classification, and we say that whatever is in this classification that is not a fair and reasonable contract for the shipment of live stock should 'go by the board.' On page 52 of the classification, number 15, we find that when shippers decline to have horses or other live stock transported at the following values—that is for horses or mules not to exceed $100 each, and cattle $50 each, and any other domestic animal $10 each—they will only be taken subject to the terms and conditions of the bill of lading issued by the originating carrier at 1½ first-class rate. We would not object to that very much if the railway company would assume the risk of carrying these animals. One and one-half first-class rate would not be too bad but that is not the whole story, because these animals are taken at certain weights, and we find that not only are you paying 1½ first-class rate but in addition to that you are paying for a weight three and four times what you would pay if you assumed the risk yourself. When each animal exceeds $100 in value and not over $400, the weight for one animal is 4,000 pounds, and if that animal is $100 or under, the weight is 2,000 pounds, so that you can send an animal worth $100 at 2,000 pounds weight and only pay carriage on 2,000 pounds, but when you come to ship an animal worth $101, you pay not only 1½ first-class rate, but on twice the weight.

Take for example a horse from Toronto to Montreal, the first-class rate is 44 cents per 100 pounds if the value does not exceed $100. The estimated weight is fixed at 2,000 pounds, that is you pay $8.80 for taking that horse from Toronto to Montreal. If the value is $150 and you want the carrier to assume the risk of the carriage of that animal, you pay 1½ times first-class rate or 66 cents per 100 pounds and the estimated weight is 4,000 pounds, so that instead of paying $8.80 for the transport of that animal, you pay $26.40, or three times as much. That is how we get it when we sign a contract which refers to that classification, and I merely state that as one illustration of the conditions under which live stock of this country are being transported from one part of the country to the other.

Take another illustration. Up to now the law has been that where a man goes in charge of a live stock shipment, he is usually asked first to sign a release to the railway company. In one particular instance in which Burns & Shepherd, of Toronto, were shipping horses, one of their shipments was in charge of their man, who was killed on the way in. Unfortunately for the railway company and very fortunately for his family, he was killed by the negligence of the employees of the railway company, and his relatives brought an action against the railway company. The company

brought Burns & Shepherd into the case and said they were liable, but the court decided that Burns & Shepherd were not liable, but that the railway company upon whose line the accident happened was liable.

The condition of affairs at present is this: that when they were asked to submit this new contract, they actually had the audacity to submit a contract which asked you to be liable for your employee who is in charge of a shipment of live stock and whose death might be caused by the negligence of the railway company. I had never heard of such a preposterous idea before, but that is what has been submitted to your representatives as a fair and reasonable contract, covering the shipment of live stock. It is the law of the land that there must be a person in charge of these live stock shipments, and the company will not accept them for shipment unless there is a person in charge, and the railway companies say, notwithstanding, this is the law of the land, we require the shipper not only to assume the risk, but also to indemnify us against any loss which we may sustain owing to an accident to your man in charge of your live stock, notwithstanding that that accident may have been caused by almost the asinine effort of some railway employee to run two trains on the same track going at great speed in opposite directions.

That is the position with regard to that and we simply say that we cannot stand it. We have assumed this position that there should be no general difference between shipments of live stock and shipments of any other kind of merchandise. We ought to recognize, however, that there is a certain risk in shipping live stock by rail. These animals will move about and they will injure themselves at times. Horses have been known to jump out of cars and we say that, in fairness, we ought to take care of any inherent vice. (I have to use that term because the railway companies' lawyers have been pumping it into me.) We admit that we ought to take care of that, but when once we have done that, then we want to be exactly upon the same terms as shippers upon any other class of merchandise.

If I ship an animal by rail to-day that is worth $600 and he is killed, it is $600 worth of damage to me just as much as $100 of damage to a man who ships an animal worth $100. You cannot make a contract with a railway company by which they are not liable for their negligence, but they can limit that liability to such a point that it brings it practically down to the vanishing point. In every shipment of live stock, you sign a contract which contains a condition that if that animal is lost owing to the negligence of the railway company, not only are you to be out of your time and so on, but you must actually accept, if it is a horse, $100 as full compensation for your injury, notwithstanding the fact that the horse might be worth many times that sum. We say the company must assume the risk and that the car fastenings must be made properly, and that the burden of proof where accidents happen by the opening of a door of a railway car, must be upon the railway company to show that that door had a proper fastener, and not upon the shipper to prove that it had not a proper fastener. That point has been before the Railway Commissioners to-day and it is adjourned.

The contract which the railway companies submitted to us in the first place was so preposterous that we practically threw it back at them and they have now submitted to us for the first time an entirely new contract, and we have not had time to go over it thoroughly, but I may tell you frankly that I do not approve of all of it. There are things on the first two pages that are just as bad as they were in the first place.

I thank you for the very patient hearing you have given, and I trust when next we meet we may have a live stock contract with the railway companies which will at least embody reasonable conditions, even if we cannot get everything we ask for.

W. F. Stevens.—I will take this opportunity of announcing that I have had placed in my hands a copy of the Manitoba proposed live stock shipping contract to which Mr. White referred, and I have had a number of copies typewritten, and we

have arranged for the Alberta delegates to meet this evening to discuss this contract in order to express our views in writing to our solicitors. Any delegate from any other province wishing to meet with us has the privilege of doing so. Mr. White referred briefly to a set of regulations which has been submitted to the Board of Railway Commissioners, and which we hope will come up for hearing as soon as this contract has been disposed of. We want to have our live stock properly loaded and unloaded. I will not undertake to go into the details of this matter, but I may say that the western shippers are suffering from these difficulties and we are trying to have them eliminated.

SIXTH SESSION.

Committee on Resolutions.—A. W. Smith, William Smith, N. Garneau, C. A. Archibald, J. A. Telfer, Theodore Ross, James Duthie, Robert Sinton, George Lane, Alex. Davey, Lt.-Col. McEwen, Lt.-Col. Campbell.

A. W. SMITH.—Mr. Chairman and Gentlemen,—The Committee on Resolutions have prepared a report to present to this convention, and I will ask Mr. Westervelt, the secretary, to read that report to you. It contains all the resolutions that we wish to bring before the meeting.

Mr. A. P. WESTERVELT.—The Committee on Resolutions beg leave to report as follows:—

(1) That a Transportation Committee consisting of A. W. Smith, William Smith and Robert Miller be appointed to take up questions dealing with tariffs and shipping regulations.

(2) The following resolution dealing with express rates was referred to the Committee on Resolutions:—

That whereas the different express companies are allowed at the present time to charge 60 per cent extra over the eastern rate for the same haul, and whereas the shipping of single animals, particularly sheep and swine, between the four western provinces is done by express, therefore we, the live stock members of the National Convention assembled in Ottawa, February 12 and 13, 1912, believe that these rates are excessive, and that this convention request the Railway Commission to equalize the express rates in all parts of Canada for the same distance, and that a copy of this resolution be sent to the Railway Commission.

It is recommended that this question should be referred to the Committee on Transportation.

(3) Correspondence from British Columbia to the Live Stock Commissioner regarding rates to horse shows was referred to our committee, and it is recommended that the Transportation Committee be asked to deal with this question.

(4) The following resolution was referred to our committee and it was recommended that the Transportation Committee be asked to deal with it:—

Whereas it is greatly in the interests of the horse industry of Canada that every opportunity be provided to enable farmers to breed their mares, both grade and pure-bred, to pure-bred stallions, and

Whereas it often transpires that the only opportunity of accomplishing this is by shipping mares to those centres where pure-bred stallions are kept,

Therefore, be it resolved that this National Live Stock Convention do strongly urge the management of the various railways in Canada to make such provision that

mares shipped to be bred to pure-bred stallions should, after full rate to the railway stations, where such stallions are kept, be returned free, and that this convention do appoint a committee to bring this matter before the railway managements.

(5) The following resolution was referred to the Committee on Resolutions by the Special Committee on Horses, and it is recommended that it be adopted by this convention:—

Whereas legislation in regard to stallion registration is now in force in four provinces of the Dominion of Canada, and

Whereas such legislation has already been effective in improving the character of stallions in public service in those provinces,

Therefore, be it resolved that this National Live Stock Convention do strongly recommend the governments of those remaining provinces in which such legislation is not in force, to pass legislation for the control of stallions kept for public service in those provinces,

And further be it resolved that the secretary of this convention do send a copy of this resolution to the Ministers of Agriculture in these various provinces.

(6) It is recommended that the following resolution be adopted following the discussion on bovine tuberculosis:—

Resolved that in the opinion of this association, it is eminently desirable that the Dominion government should, at the earliest possible date, suggest a policy having for its object the control and, as far as possible, the eradication of bovine tuberculosis on the lines recommended in the report of the International Commission.

(7) The following report was submitted to our committee by the Special Committee on Horses:—

'Your committee would suggest for the consideration of this association the advisability of commending the Minister of Agriculture on his suggestion made in Toronto at the dinner given by the Holstein association last week, to divide his Department between deputies, one to have charge exclusively of the agricultural work of the Department, and trust he will complete the arrangements as suggested.

'And further, this association would respectfully suggest that there be appointed a Bureau of Live Stock Industry comprising a permanent chairman and four members, one representing the west, one the east and two from the central portion of the Dominion, whose duty it shall be to regulate, encourage and foster in every way the interests pertaining to the live stock industry, subject always and only to the sanction and approval of the Minister of Agriculture.'

It was decided to forward this report to the convention for discussion.

(8) The following resolution was submitted by the Special Dairy Committee:—

'Moved by W. F. Stephen, seconded by B. Mallory, that we, the members of the National Stock Breeders' Association desire to place on record our most hearty appreciation of the earnest and untiring efforts on the part of the Department of Agriculture of the Dominion government in the organization and carrying out of the Record Performance tests.'

It is recommended by the Committee on Resolutions that this resolution should be adopted.

(9) The following resolution was submitted by the Special Dairy Committee:—

'Moved by R. Reed, seconded by W. F. Stephen, that the Department of Agriculture of the Dominion government be approached and requested to enact a law that in the sale of milk for domestic use, to creameries or cheese factories, the butter-fat percentage shall be the basis upon which payment shall be made.'

This resolution is referred to the convention for discussion.

(10) The following resolution was referred to our committee by the Special Dairy Committee:—

'Moved by R. Ness, seconded by R. Reid, that in the opinion of this, the National Stock Breeders' Association of Canada, a veterinary inspector or inspectors should be

appointed permanently in Great Britain for the examination of pure-bred stock previous to their shipment to this country and that they should always be at the service of importers.'

It was decided to refer this resolution to the convention for discussion.

(11) The Resolution Committee recommend the adoption of the following resolution:—

'Moved by Lt.-Col. McEwen, seconded by Lt.-Col. Campbell, that the members of this convention wish to place on record their appreciation of the action of the Minister of Agriculture in bringing together the representation of the live stock interests of Canada for the purpose of discussing matters relating to live stock; and this association respectfully suggests that some permanent arrangement be made by the Minister to enable this association to hold a convention once every two years.'

(12) The committee recommend the adoption of the following resolution:—

'Moved by Lt.-Col. Campbell, seconded by James Telfer, that this association wishes to express its hearty appreciation of the work performed by Dr. J. G. Rutherford, Live Stock Commissioner and Veterinary Director General, in the interest of live stock in Canada and the able manner in which he has administered these branches.'

(13) The adoption of the following resolution was also recommended:—

'Moved by Lt.-Col. McEwen, seconded by C. A. Archibald, that a vote of thanks be tendered to all those who have taken part in the programme before this convention.'

All of which is respectfully submitted.

(Signed) A. W. SMITH, *Chairman.*

(The report of the Resolutions Committee was then taken up clause by clause.)

(1st clause read and carried.)
(2nd " ")
(3rd " ")
(4th " ")
(5th " ")
(6th " ")
(7th "

A MEMBER.—Would the mover of that resolution explain his ideas with regard to it?

Mr. JOHN BRIGHT.—In moving the adoption of this report from that committee which was appointed yesterday, I might say that your committee considered favourably the message that the Minister of Agriculture brought to Toronto at the dinner given by the Holstein Association last week. They felt like commending him on his good intentions of doing what we feel, and have felt for sometime, would be very beneficial to the live stock interests of this country, namely to have a Deputy Minister of Agriculture, who was in every sense of the word a Deputy Minister of Agriculture, and who would not be hampered with the different lines, such as patents, copyrights and census. We believe the agricultural interests of this country are of such importance that a Deputy Minister or even a Minister should attend to them without having any other business to look after, and that is why your committee decided in favour of commending the Minister for what he said last week in Toronto.

Then your committee thought the live stock interests of the Dominion of Canada were large enough to have a Bureau of Live Stock Industry to work out the best interests of live stock in the Dominion. We believe it is a move in the right direction. We are not finding so much fault with the way it has been handled in the past. I do not wish to take up any more of your time, but I trust you will meet this resolu-

tion favourably and pass it on to the Department of Agriculture as a recommendation for the advancement of our interests. I move the adoption of the clause.

Col. McCrae.—I do not rise to second it. I rise to object. I do not like the preamble of that resolution. I do not think we need to go into any history of what was done at Toronto. If this is necessary, we might as well start right out and say it. I think the preamble ought to be dropped, and we ought to pass a straight resolution saying that we think so and so should be done.

Mr. John Bright.—The reason we took up that preamble, as you call it, was the fact that the Minister of Agriculture was reported to have said at Toronto the other evening, something, and we felt that he should be commended for saying it. Instead of coming out at this meeting and demanding or suggesting something fresh, as if it were never in his mind, it was in the mind of the committee to stand behind him and to strengthen him in carrying out the good intentions that he evidently had in mind when he spoke in Toronto.

Col. McCrae.—Then I think whether he said it or not, it ought to be adopted. It is a good move and some of us have thought that way for a good while. In fact I can say that the late Minister of Agriculture had a suggestion along this line made to him before the present Deputy Minister was appointed, that he should get the very best live stock man in the whole Dominion of Canada to fill that position.

A Member.—We felt that way fifteen years ago.

Col. McCrae.—I have no objection to the gentleman who fills the position, still I think that a gentleman belonging to the legal profession is not the very best man to put in that place. He is not in touch with the live stock interests of this country, and if you will drop that preamble I am quite willing to second the motion.

Mr. Clemons.—There seems to be some doubt as to whether the Minister said it. I will vouch for his having said it because I heard it.

The Chairman.—Will you second the motion?

Col. McCrae.—No, I will vote against it.

(Motion seconded by Mr. McPhail and Mr. Bredt.)

The Chairman.—You have heard the motion and there are two seconders, is it your pleasure that this resolution shall be accepted?

Col. McCrae.—I think it would be better to have it read over again. There is a second part to it on which there has been no discussion.

(Motion put to the meeting and carried.)
(8th clause read and carried.)
9th clause read.)

Col. McCrae.—That is a very important matter.

Mr. G. W. Clemons.—I move that that be adopted.

Mr. W. W. Ballantyne.—I second the motion.

Col. McCrae.—They state there butter-fat and they do not take into consideration the other solids in the milk.

The Chairman.—My opinion would be that the butter-fat would be taken into consideration along with the other solids.

Col. McCrae.—I think the other matters ought to be considered. I am not a dairyman and I do not know anything about it, but I know there are other things in milk besides butter-fat.

Mr. CLEMONS.—If you have 4 per cent milk, they add 2 per cent and call it 6 per cent milk and that provides for the other solids in the milk. That is Professor Dean's method.

Col. MCCRAE.—This resolution is just the opposite of that. It says butter-fat.

Col. CAMPBELL.—When that reolution came before the Committee on Resolutions, it was simply referred back to this meeting for explanation, and I think we should have an explanation as to why this should pass.

Mr. CLEMONS.—Where they buy milk at the cheese factories by the test, they add 2 per cent to the butter-fat so as to take in the other qualities in the milk. I have been at meetings of cheese factories where they are paying by the pooling system, and the cheesemaker has taken twelve pounds of milk to make a pound of cheese, and I think this paying by the test will result in a great deal of good.

Mr. RUDDICK.—If it is in order, I would like to say a word on this question. This is a matter with which I as a dairy expert, have had something to do. Ever since the question was proposed in this country of paying by test in cheese factories, I have been interested in it. I believe I was the means of having the first factory in this country adopt that system. We have had a great deal of difficulty over this question and it would not serve any purpose to discuss technicalities here, but I should regret very much if you passed that resolution in its present form, because it would be a great mistake and I do not think you know what you are passing—if you will allow me to put it in that way. If you say that milk should be paid for according to quality, I think that would cover the point, and leave the matter of working it out to those who have to do with the tests. We had a conference here, under the auspices of the Department, a few weeks ago, and that was one of the main questions which were discussed, and we were not able to come to a definite conclusion as to what particular plan was best to recommend, and we decided to make some further investigation during the coming summer and we hope to be able to arrive at some unanimous agreement and have a definite plan to lay before the cheese factories. At creameries they pay according to fat content, and it is a very important thing to the cheese factories. I hope that you will not pass that resolution as originally presented to the meeting.

Mr. CLEMONS.—One object in moving that resolution was that I am secretary of the Holstein Association, and it is a common thing in the country to discredit Holstein milk, and I thought if I moved this resolution, it would show the public that we are not afraid to have our milk tested and paid for by the test.

Mr. BALLANTYNE.—I move that the resolution be changed, and instead of stating to pay according to butter-fat, that it would be paid for according to quality. I think it should be made quite plain that in creameries, they should pay according to butter-fat. I believe in eastern Ontario, a number of creameries are paying according to the pooling system and that is very unfair.

Mr. RUDDICK.—I do not think there are any creameries paying that way.

Mr. BALLANTYNE.—I have been told that there are a number—some in Quebec and some in eastern Ontario.

Mr. RUDDICK.—There may be in Quebec, but I do not think there are any in Ontario.

Mr. SMITH, Dewdney, B.C.—I move that that resolution be left over until we get a report from the dairy experts. I think we are only losing a lot of good time.

Mr. CLEMONS.—I will withdraw the motion.

The CHAIRMAN.—You have got to withdraw it because you have no seconder.

(Moved by Mr. Smith, of Dewdney, B.C., and seconded by Mr. Hubbard, that this resolution be left over until the question is decided by the dairy experts. Carried.)

(10th clause read.)

The CHAIRMAN.—In my opinion, the Scotchmen are no better than they should be. I bought a heifer that was tested by a veterinarian over there and I brought her here and she died of tuberculosis. She had come through quarantine and everything else. I was satisfied that she did not get proper attention. I think it is quite right to put that resolution in the way it is. I would like Dr. Rutherford to give a few words of explanation.

Dr. RUTHERFORD.—Mr. President and Gentlemen,—This is a resolution which somewhat affects the internal economy of the Health of Animals Branch, which is one of the branches of the Department over which I have supervision. The reason why the policy of keeping a veterinarian in the old country was abandoned after having received a fair trial for a few months, was the practical impossibility of getting a fair chance to test the cattle. I, myself, for some eight months occupied the unenviable position of official tester of the Canadian government in Great Britain. It is very easy to talk about, and if the number of importations of cattle is comparatively small and they come at reasonable distances apart, it is not impossible to get things done properly, but when you get a letter, as I used to do, from one importer saying that he had bought, perhaps, forty cattle for shipment to Canada and wanted to have them all tested at twenty different places, it is an entirely different matter. This letter, I would receive probably on the 4th or 5th of the month and he would want them all tested by the 15th of the month, and then, before the work was well started. I would have a like communication from some other Canadian importer, so that it was quite often an utter impossibility to even get from one place to the other within the prescribed period, to say nothing of properly testing the cattle.

That sort of thing went on all summer, and during those eight months I hardly ever sat down. You can understand what a magnificent opportunity such a system gives an unscrupulous owner to do up a veterinarian no matter how careful and conscientious the latter may be. There is not time to give the work proper care and attention. The breeders will not send their cattle to any common point of shipment in order to have them tested, and you can understand why, because if any of them were shipped back, that would mean disgrace from that time on.

The testing done by many old country veterinarians is not reliable. An occasional veterinarian in the old country can be depended on to make reliable tests, but the great majority will not take the trouble to do it properly, and the methods followed are, in some cases, almost incredible. In fact it was a very common experience on the part of owners and breeders over there after I had been at their places and made a test, to say that was the first time they had ever seen cattle go through the tuberculin test, although veterinarians had often previously been there to test cattle for export. The results are shown in the case of cattle exported for the Argentine Republic. I took this matter up with the Dominion Cattle Breeders' Association in 1903, and after explaining the whole situation to them, the present arrangement was agreed upon and I got an agreement in writing from the Dominion Cattle Breeders' Association, which is on file, and the present system was then adopted and has been found to work fairly satisfactorily.

It is unfortunately true that a man will occasionally get an animal over, for which he has paid a comparatively high price, and have it tested in quarantine at Quebec or St. John and it will go home with the official T on its right ear. Some of the breeders object to having animals marked in that way, but as far as the general health of the cattle of the country is concerned, it is infinitely better that an animal should be properly marked as a re-actor than taken home and put into some healthy herd unsuspected.

Capt. Robson, London.—In the old country they have sales, and at these sales the cattle are tested and have to pass the tuberculin test. Can you tell us if these cattle are properly tested?

Dr. Rutherford.—I have already told you that I have but little faith in the tuberculin test as performed by many veterinarians in England.

(Moved by Col. McCrae, and seconded that the motion be laid on the table. Carried.)

(11th clause carried.)
(12th clause carried.)
(13th clause carried.)

REPORT OF NOMINATING COMMITTEE.

Professor Cumming.—Mr. Chairman and Gentlemen,—Sometimes it is difficult to get enough men to fill offices available. This time the trouble has been not to get the men, but there have been so many names to choose from that we have had difficulty in knowing whom to leave out. With that explanation, I beg leave to move that the following be the officers of this association:—

President—Andrew Graham, Pomeroy, Manitoba.

Vice-President—John Bright, Myrtle, Ontario.

Executive Committee—Hon. N. Garneau, Quebec; P. M. Bredt, Regina, Sask.; Capt. T. Robson. London, Ontario.

Secretary-Treasurer—A. P. Westervelt, Toronto, Ontario.

Directors—British Columbia, A. D. Patterson, Ladner; Alberta, John A. Turner, Calgary; Saskatchewan, Robert Sinton, Regina; Manitoba, A. C. McPhail, Brandon; Ontario, W. W. Ballantyne, Stratford; Quebec, Victor Sylvestre, Clairvaux; New Brunswick, Lt.-Col. Campbell, Apohoqui; Nova Scotia, M. Cumming, Truro; Prince Edward Island, Hon. M. McKinnon, Charlottetown.

The Chairman.—We are now going to have the honour of an address from our worthy Minister of Agriculture, the Honourable Martin Burrell, and I am sure you will all be delighted to hear a few words from him.

ADDRESS.

Hon. Martin Burrell, Minister of Agriculture, Dominion of Canada.

Mr. Chairman and Gentlemen of the Live Stock Association:

Do not look alarmed, I am not going to make another speech, but your chairman has kindly asked me if I cared to say a word, and I would like, before you all separate, to express the peculiar pleasure I feel in knowing that you have all been gathered here together to discuss questions affecting your common interests, and to crystallize your deliberations for the betterment of your industry into suggestions for legislation, some of which, I hope, it may be possible for the government to carry out. I notice that you have passed a resolution suggesting that the Minister should approve of some way of calling you together oftener than every four years. It is four years since you were here last. If it is thought desirable that this association should come together

earlier than four years. I will be very glad to take that matter into consideration. It is only natural that you should expect me to do anything that will meet your interest and will advance your own business. Speaking for the government and speaking for myself as Minister, I shall be only too glad to do anything in my power to help along the live stock interests of the Dominion. I have had the privilege of having one or two of you gentlemen wait on me with suggestions, some of which I confess appeal to me favourably.

Although these resolutions seem delightfully easy to those who pass them, it is sometimes not so easy to pass them in the House of Commons where everybody is not a stock-raiser. I think you understand some of these difficulties.

I regret that it won't be possible for me to stay through the session, but I wanted to be here as much as possible so as to get the benefit of your discussions. Let me thank you again and wish you all luck and prosperity during the present year.

The CHAIRMAN.—We will now proceed with the usual programme, and I have much pleasure in calling upon Mr. Robert Miller to speak on the 'Regulations Governing the Import and Export of Live Stock.'

REGULATIONS GOVERNING THE IMPORT AND EXPORT OF LIVE STOCK.

Robt. Miller, Esq., Stouffville, Ont.

Unfortunately circumstances over which I have had no control have prevented me from preparing a paper on this subject, and the little preparation I have made has been chiefly since I came here this morning.

I propose to say something of the regulations or the want of regulations that have existed in Canada since the first importations of pure-bred animals were made into this country. It was a common subject of discussion in the house in which I was reared that the first importations of pure-bred animals took place to this country about the year 1830, and, up to the year 1881, the business of importing live animals into this country was chiefly carried on between Great Britain and Canada and it had rather an uphill career. In the first place, if a breeder bought a horse to be imported to this country, he had to settle with the sailing ship companies and agree to pay them £50 for the carriage of that horse to this country—$250, no matter whether the animal was large or small, that rate was charged. If we bought cattle, we had to pay £30 apiece, or $150, to the sailing ship companies.

I first began making importations in the year 1881, and after paying a good sound price for the animals in the old country and these exorbitant fees for the carriage of them across, we only landed 50 per cent of the animals that were purchased and for which carriage had been paid at these rates, and I think I am speaking reasonably when I say we had a tempestuous career up to that time. As I said before, I made my first importation in 1881 and the second in 1882, and I had every dollar I possessed on the face of the earth invested in the shipment of horses in that year, and the halters came home without any horses, so that I was stripped of what little money I had saved up to that time.

After 1881, we had to pay 12½ guineas insurance on animals, but changes have been made so much in our favour since that, that you can now get insurance for 2½ per cent or 2¼ per cent, and we have had better profits from importing animals and selling them again. We have never received any particular assistance from the government in that regard. Up to 1881 and for a good many years after, not many animals were imported from the United States. We did not have to show any certificate of registration, and up to a few years ago we did not have to have them examined

by a veterinary surgeon, but the natural feeling in this country as to the conservation of the quality of our animals has made us take greater precautions in many ways. We have also desired to conserve the health of our animals, and restrictions were put on and the animals had to undergo a certain examination and now we have to show a certificate of registration. That certificate of registration might be almost in any form up to a few years ago.

This association has done one good thing in the fact that you impressed upon the ex-Minister of Agriculture the great necessity of having a uniform certificate of registration presented for every animal before it can be brought into the country as a pure-bred animal free of duty and sold in Canada as a pure-bred animal. We impressed that upon the ex-Minister, and after a great deal of pressure he finally gave us what we asked for, so that to-day, we have comparatively good regulations governing importation of pure-bred animals into this country, and no man can go abroad and buy an animal and have it brought to Canada free of duty without showing at the lines that it is a pure-bred animal. That is worth a great deal, because under the conditions that existed before that time, animals were brought into this country and they are still here and they are nothing but grades, but were passed as pure-bred.

After the American war, there was a great scarcity of animals in the United States and quite a trade was worked up between Canada and the country to the south. There was a duty of 20 per cent placed on horses, and we had to give an invoice value of these animals, and there was an inspector at each port and it was left to that inspector to say whether these animals were properly valued or not. If he said they were, they were passed into the United States with 20 per cent duty; if he said they were not, then the animal was seized and sold by auction and the inspector received half the money that the animal was sold for, so that the men who came over here and purchased horses took great chances.

That condition of affairs could not be very satisfactory either to the men importing from this country or men exporting. There was a change made and the duty was taken off animals but they had to be inspected before they went into the United States, and if the inspector decided these animals were good enough to improve the general stock of the country, they were accepted, and if he decided they were not, they had to pay a duty of 20 per cent on the value. That also become unsatisfactory and then they said: 'We must have a certificate of registration for each animal before it can come in free of duty.' Fraudulent certificates, with one or two exceptions, were presented, and these were soon found out and exposed. After a time, the government of the United States came to the conclusion that they knew more about what should constitute a certificate of registration that the live stock associations either in Canada or the United States, and they said, 'These certificates must be constructed in a certain way to show the sire and dam and the two grandsires and two grand dams.' That was difficult to comply with in some classes of live stock but, however, we complied with it and then they changed the regulations again. During the last calendar year, the regulations governing importations of live stock into the United States were changed four times and we had to meet these changes and sometimes we suffered losses in doing so.

Some few years ago, the question of our regulations regarding pure-bred animals was brought up by Dr. Rutherford, and I was entrusted with the presentation of the case as it affected the live stock breeders in this country, and after looking through the regulations, or purported regulations, I came to the conclusion that we simply had no regulations at all governing the importation of pure-bred animals into this country. Any sort of a certificate could be presented to the customs house officer and he allowed that animal in free of duty, and the consequence was that many of the animals were not pure-bred. We asked that a change should be made, and we asked that the Canadian record should be the only record that would be recognized for customs purposes by the Canadian government. And I say we should be proud of

our regulations, because they are plain and simple and effective, and they are reasonable.

We asked that a change should be made governing the importation of horses for working purposes. Before that time, the great majority of the horses came in at a valuation of $10 each with a 20 per cent duty charged up against them, and the result was that very many of the horses that came in here cost about $2 each for duty. We came to the conclusion that we did not want horses in this country that cost in the neighbourhood of $10 in the United States, and I think that was a very wise conclusion. The men in the western country said they were beginners, homesteaders on that land, and they could not afford to pay very much for a horse. I contended it was no kindness to make it easy for a man to get a horse to put on that new land that was only worth $10. I say there is no greater enemy to a farmer than to have a horse that is absolutely no good. I am pleased to say that after a time we got a little change in that direction, and we now have a minimum valuation of $50 placed on each horse and the duty raised to 25 per cent, so it is impossible for a man to bring in any kind of a horse to this country without paying at least $12.50 duty.

I will give you some idea of what that change brought about. In the year 1901, there were 8,836 horses imported into this country at a value of $275,000, or $31 each. I told you that if a horse were placed at a value of $10, it could gain entrance, but part of them were placed at quite a high value, so that it made an average of $31.10. In the year 1906, the value was placed at $50 each, and 17,000 horses came to this country and the average value was $62.90. In the year 1907, before this new regulation came into effect, there were 16,000 horses imported and the value was $52.80. In the year 1908, after this little change was made and was in operation, there were only 6,000 horses imported at a value of $190 each.

I want to ask you if you did not find that change was a benefit, and I want to ask you if you can remember the class of horses that were going into that western country to compete with the horses that were coming in from the United States. We were shipping the cheapest class of horses that could be found in the province of Ontario to the west. They were purchased here and taken out there and sold for what they would bring. After that change was made and the minimum value of $50 had been fixed, the result was these people said, 'We must have a change and we cannot sell these old skates out there at any price; the farmers won't have them,' and then they bought the best horses they could buy, and to-day you can scarcely get horses in Ontario good enough for these western provinces.

Look at what was brought about by that little change, and I say that the convention that met here three or four years ago should be thanked for bringing about that change. The resolution was passed in the face of some opposition. Some arguments were brought up against it, but finally it carried by a large majority and the results have been splendid, and there is soon going to be no country on the face of the earth that can set up their whole population of horses and compare them with the horses in Canada without Canada showing up the best and coming out of the contest with flourishing colours. We have asked another change to be made and it is being considered by the Minister of Agriculture.

Before we can send a horse to the United States, we must pay duty on the value of $150, no matter what that horse is worth. The result is that the horses that have been going from this country into the United States were valued as follows: In the year 1901, $119 each, and at that time the horses we were importing from the United States came into Canada at a value of $31.10. In the year 1906, the value of the horses coming from the United States to this country was $62.90 and the horses that we exported to the United States were valued at $190 each. Do you think it is a good thing that we should be forced to send out that class of horses before we can get a market for them in that country, while we encourage them to bring into our country a class of horse that can do us no good and that they are anxious to get rid of?

In the year 1908, after the change I have referred to was made, the horses that came into this country were worth $190 each, and I will admit that there has been an increase in value since that time, but the horses that went from this country were worth $227 each. In the year 1909, the value of horses that came into this country went down to $87, while horses that went from here to the United States were valued at $172. In 1910, the horses that came into Canada were valued at $66. We were not bringing in high-class horses, because they were worth more in the United States than in this country. In the year 1911, they were valued at $85, and the horses we sent into that country were valued at $217 each, and only about $2,000 worth altogether. We asked that that minimum value of $50 placed on horses coming into this country be increased to $150 so that we will stand exactly on the same footing as the people we do most of our business with in this country.

With regard to pure-bred animals, we have no fault to find with conditions as they exist, especially with regard to cattle, because we are not getting any competition in that line but what we can meet quite easily, and we feel that we are short of cattle and we need all we can get. You might say the same state of affairs exists with regard to horses, and so it does up to a certain point, but there are gentlemen in the United States who import horses, and it is a matter of public notoriety that some of these men are not recognized as reliable men in their own country. They send horses with certificates to this country, and in many cases they are accepted because they comply with our regulations and yet the signatures of these men would not be accepted by associations which they have helped to form on the other side. They send scores of horses in here to 'stool pigeons' in this country who say they are British subjects and that they are entitled to bring in these animals and they are the owners of them and they pass them into this country free of duty. In many cases it has been found that they have presented certificates that were not issued for the animals at all. They have been known to change the ages on certificates, and we have some cases to deal with showing that these men have no partnership or interest in these animals whatever, and that they have simply lent their names and have been working for wages and selling the animals here, and the money that is paid for the animals is passed over to the real owner who lives in the United States.

I remember quite well quoting to you one particular instance that came under my observation near the City of Moosejaw. I saw a very big horse there, perhaps one of the biggest horses I have ever seen, and the man in charge told me he was a wonderful horse, a Percheron, bay in colour. I could not have told what breed he was by his colour or his legs. I think he was a mixture of two or three breeds. The man in charge said the company that owned him had paid $5,000 for him. To cut it short, he was the biggest and worst horse I ever looked at, but he had one redeeming feature and that was that he did not leave any progeny in that country, and these men lost their $5,000 and their time. The man who brought that horse into this country was not responsible to anybody in this country and not responsible to many people in any other country, but he got his $5,000. The fact that he sold that horse discouraged a lot of men who were willing to invest their money in trying to do something for the live stock business. I say that a man who has the right to bring pure-bred live stock into this country free of duty, should not only be a British subject but he should be a resident of this country, and if more than one man has part ownership in that animal, each one of them should be residents of this country as well as being British subjects. We are asking for a change for the protection of men who invest their money in these valuable horses, and I believe it is the opinion of every man interested in the welfare of the stock business of this country that that change should be made. All we want added to the regulation are the three words that were taken from that regulation after that regulation went from this National Live Stock Convention three years ago: 'resident of Canada' was removed from the regulation as we recommended it to the Department of Agriculture at that time, and I say the remov-

ing of those three words was a very great mistake. I said at the time that by doing that, they took the sting out of the whole thing. I would like to have the sense of this meeting as to whether it would be a judicious thing to add those three words that were taken from this regulation as we passed it three years ago, and in order to bring it before the meeting, I will make a motion and ask every man in the room to stand up and say whether he would like to have these three words added to the regulations as they now exist, and I move that the words 'resident of Canada' be added to the regulations as they now exist.

Capt. ROBSON.—I second that motion.

Mr. ROBERT MILLER.—The regulation as it stands at the present time is that in order to import an animal into this country free of duty, the importer must be a British subject and he must present a certificate of registration in the Canadian National records, and must have complied with the regulations in force by Dr. Rutherford's department. You cannot follow a man into the United States and get justice, and even if you did it would cost more than it would to stand the loss sustained by the fraudulent sale, and the result is that in ninety-nine cases out of one hundred the men in this country have to lose.

Col. CAMPBELL.—Before the motion is put, I would like to hear from Dr. Rutherford on that subject. I remember when the motion was made, Mr. Miller made the same remarks, four years ago, that he has made here to-day.

Dr. RUTHERFORD.—I do not know that I have anything special to say. The resolution was passed in the terms in which Mr. Miller wishes to pass it to-night, but after giving the matter due consideration the Minister decided that in view of the fact that it contained a somewhat unkind suggestion to our friends who are British subjects and not resident in Canada, but resident in England, Scotland and Ireland, and who are in a somewhat different position from the American people, it would hardly be advisable to go the whole way and narrow down the issue to the exact point that this association wished.

Mr. JOHN A. TURNER.—I think Mr. Miller is out of order. There was a Resolutions Committee appointed and why did not Mr. Miller hand that in? I arrived late here from Alberta, and I spent four days coming down and I will spend four more returning. We have listened to some very able papers that we were glad to hear, but at the same time I think at this convention there should be a little more time devoted to business. I am not objecting to the resolution, but I think it is out of order to bring it in at a meeting of this kind without giving the other members of the committee time to consider it.

Mr. MILLER.—I could not deal with this matter until this time because I was not here when the committee was appointed.

Mr. TURNER.—Neither was I, and I have sat here doing nothing ever since I came.

Mr. MILLER.—If the breeders of horses in this country think it is better to leave it the way it is, I am perfectly satisfied.

A MEMBER.—I understand you just want an expression of opinion with regard to the matter.

Mr. MILLER.—That is all I want, and that is what this convention is called here for.

Mr. SINTON.—How would this resolution affect the resolutions with regard to immigrants coming in from the south?

Mr. MILLER.—They could bring in any kind of horse so long as they brought it in as 'settlers' effects.' This has nothing to do with settlers coming into the country. We are speaking of the importation of pure-bred animals for breeding purposes that are allowed into the country free of duty.

A MEMBER.—It has reference only to horses from the United States?

Mr. MILLER.—No, it refers to all horses imported from any country. I have simply mentioned the United States oftener than I have mentioned any other country. That is exactly the objection the Minister had to these three or four words being attached to the regulation, he said, 'We would be saying to the men in the United Kingdom that we did not want them to bring horses into this country free of duty.' There is a little sentiment in that and I like sentiment of that kind, but the chairman sprang the key note when he said that 'Scotchmen were no better than they ought to be,' and we need that clause in here to protect ourselves against unscrupulous class of Scotchmen that buy and sell horses, and you will not find men in any country whom you want to be guarded against more carefully than certain men who handle horses in Scotland. I have just as much good feeling towards the people in Scotland as any other man, because I come from there, and my grandfather was a horseman in that country. I am not speaking of them as a class, but I am speaking of special men who sometimes make shipments to this country of horses that they could not sell in their own country. Therefore, I say it is no hardship to say that those who import pure-bred animals shall live in Canada.

Mr. A. W. SMITH, Maple Lodge, Ontario.—As there seems to be some doubt as to whether those words should be put in or not, I might say that the committee is still in existence and I can convene them in a few minutes and hand that motion in in the regular order.

Mr. MILLER.—I would be pleased to have that done. I did not know just how to get at that.

I wish to congratulate the chairman on the good work that has been done at this convention in the past. I am very pleased, indeed, to see the increased interest that is taken by the responsible men of this country in the live stock business. I know those who come here do so at great sacrifice, and I am pleased to see that some of the best men from all parts of the Dominion of Canada are interested enough in the work to come here and deliberate with regard to the little details that come up in connection with the live stock business. This association has done good work in the past, and I believe it always will do good work in encouraging the breeding and importing of really good, sound, reliable well-bred animals.

THE CHILLED MEAT TRADE.

E. G. Palmer, Edmonton, Alberta.

In addressing you upon the chilled meat trade, I must ask you to pardon me if my remarks appear somewhat disjointed, as since receiving the very kind invitation of the executive, I have had no opportunity in which to prepare an address and, therefore, what I have to say will partake more of the nature of a talk on the question.

In the first place it may be as well to point out that chilling and the chilled meat trade has reference to the preservation and marketing of meat and other products at a temperature above its freezing point. To illustrate what it means to a country to be able to market its produce in this manner, I will just take one commodity, viz., beef, it being probably the one in which you are more particularly interested.

Now, the freezing point of beef is about 27 degrees F., and it is possible to keep beef in a thoroughly sound and saleable condition at slightly above that temperature for about six weeks. After this time putrefaction will make its appearance and the meat will rapidly become off-colour and unsaleable as a first-class article. From this you will readily see that for any country to successfully undertake this class of trade, it must be within, say, three weeks of its market, the remainder of the time being occupied in assembling shipments and in the disposal of same at the other end.

Great Britain offers the best and most important meat market in the world, one free from extreme fluctuations and too large to be easily influenced by the operations of interested individuals or firms. It is the market of all others in which every country producing a surplus endeavours to obtain a footing.

For countries so far away from this market as Australia and New Zealand it is impossible to market their meat other than in a hard frozen condition. Many attempts were made from Australia years ago, when I was in the business in that country, but they all ended in failure, the temperature having to be lowered to below freezing point to allow of its arrival in a saleable condition at all. Until quite recently, therefore, this method of exporting in a chilled state was confined entirely to the United States and other countries within easy reach of the British market.

Of late years a method known as the Linley process has been in use, and it is claimed that by it meat can be held above freezing point for a much longer period. This process, however, requires the use of a preservative. Formaline is vapourized and blown into the room or chamber in which the meat is hanging and forms a thin coating on the meat. In connection with the process there is a tank containing sulphuric acid in which thin leaden discs are slowly revolving, half submerged. The air is drawn from the chamber containing the meat and passes between these discs and is returned in a purified condition to the chamber. This operation is carried out at the least once prior to the loading of the meat on board ship, and at intervals of about a week during the voyage. Cargoes are being carried in a chilled state with the aid of this process from the Argentine, and I had a letter some time ago from Mr. Linley (whom I knew very well in Australia years ago), saying that arrangements were being made to ship a cargo from New Zealand, which would mean about seven weeks on the journey. I question, however, if the process will ever become a very great commercial success. One thing is certain, that meat treated and exported in this manner will not command anything like as good a price as a similar article chilled and marketed in the ordinary way without the aid of a preservative. It is quite possible it may bring a price midway between the frozen and chilled article, but whether this will prove sufficient to warrant the extra expense remains to be seen and can only be proved by experience.

You may naturally wonder why there should be all this fuss over a degree or two in temperature. The reason is, that choice beef handled and marketed in a chilled state is for all practical purposes equal to and even superior to much of the home-killed, and brings nearly as good a price, whereas the frozen article is greatly depreciated in quality owing to the lower temperatures breaking the meat cells, and the consequent dripping, drying and loss of the juices which takes place when thawing out. Mutton is affected to a less extent than beef, and lamb again less than mutton. For this reason the frozen article brings only about half the price of the same article marketed in a first-class chilled condition, the frozen article having to cater to a totally different class of trade. You will, therefore, readily see what an enormous advantage any country has which can market its meat in a chilled state and without the aid of any preservative.

The Dominion of Canada is in that very enviable position, and I may say that this country is the only portion of the empire, capable of producing meat animals in excess of requirements, which is able to export its meat to Great Britain in a chilled state. Just think what that means to a country such as this which is so admirably

adapted for the production and finishing of all kinds of meat animals, yet this is the only country of importance in the world which has not a modern and scientific system of marketing same.

In the exporting of meat in a chilled state from this Dominion, it is not, therefore, a question of entering into competition on the British market with Australia and New Zealand. Such would be an exceedingly difficult task for us to undertake, for I have lived in those countries and know how cheaply meat animals can be produced in good seasons, and how impossible it would be for us to compete on an equal footing. Fortunately for us it is not necessary to do so, as we should receive on the British market for our chilled meat practically double what those countries receive for a similar quality of meat, marketed in a frozen state.

This morning Mr. McLean gave us an account of his firm's experience with the exporting of chilled beef, and in doing so made rather a sweeping statement to the effect that he did not think the business could be made a success.

I may say, that some three years ago, Mr. McLean very kindly allowed me to see the figures relating to these trial shipments. As far as I remember, they consisted of a car a week extending over some few months, were exported through United States channels, and only brought between 7 and 8 cents per pound on the market in Great Britain.

Now, as the average price for first-class quality chilled beef was at that time about 10 cents per pound, it is obvious there must have been something wrong with these shipments, either in the quality, get up, or condition upon arrival, or perhaps our friends to the south, not being keenly desirous of seeing the business successfully established in this country, and knowing the small amount of capital at the back of the enterprise, may have decided to kill it from the very start. However, whatever the reason (and there certainly must have been some reason for its bringing so low a price), it was surely possible to locate it, and had this been done and the cause removed, the results would in all probability have ended in success instead of failure.

Mr. McLean in his address gave some good sound advice and preached the gospel of persistency as playing a most important part in the success of any kind of business. It is, however, quite obvious, that at the time his firm made this small and very incomplete trial with chilled beef, that they were not then practising what he is now preaching.

For years past speakers have advocated the export of meat in a chilled state as a method of improving the live stock industry, and their sentiments have been applauded by their listeners, but little has been done to place the matter on a practical footing, owing to lack of assistance on the part of the government, and the impossibility of inaugurating and developing the industry on a sound and permanent basis without such help.

Some four years ago, during the time of the Dominion Fair in Calgary, at a meeting of ranchers and farmers, and presided over by Mr. Findlay, who was at that time Minister of Agriculture for Alberta, a committee was formed to collect data and information, and report to the Dominion Minister of Agriculture upon the desirability of establishing an organized system of meat exporting. The report of the committee (of which I had the honour of being a member) was printed by the Alberta government, this being a copy, and just three years ago it was presented to Mr. Fisher together with resolutions from agricultural and other societies representing over 20,000 farmers, urging the Minister to take the matter in hand and place the business on a workable basis as speedily as possible. In addition to which twenty out of the twenty-four members in the Dominion House from the province of Manitoba, Saskatchewan and Alberta, signed a strong memorandum to the Minister imploring him to take the matter up and render the necessary assistance towards establishing the industry, and at the same time pledging their support to the government in the granting of assistance financially or otherwise. The Minister was also provided with

figures showing the approximate cost of the necessary works, plant and rolling stock, and details of the cost of operating from the purchasing of the animals to their sale in Great Britain, including slaughtering and treatment of by-products, chilling, railing, icing of cars, ocean freight, insurance, storage, handling and sale in Great Britain. These figures clearly showed that taking the average price of the previous ten years for chilled meat on the British market, with the present excessive rates of freight and other charges (which would be materially reduced as soon as the business was well under way and any quantity going forward), and after allowing interest and depreciation, the business could afford to give about 5 cents per pound live weight for choice, well-finished steers and 6 cents for hogs at furthest western points, and proportionately higher nearer east corresponding with the saving of freight.

Many of you, no doubt, received copies of this report at the time, but for the benefit of those who have not had an opportunity of reading same, I may say that it showed pretty conclusively the necessity existing for a modern and scientific system of marketing the meat animals of the country, also the stable and remunerative market it would provide, and thus stimulate the production of meat animals and prove immensely beneficial to the whole Dominion. It pointed out the failure of existing methods to place the live stock industry on a sound and satisfactory basis, and also gave a brief review of the manner in which the industry had been established in other countries, of the assistance rendered by the various governments, of the immensely beneficial results which had followed its adoption, and of how it had steadily superseded the obsolete and antiquated method of marketing on the hoof. It included an examination as to how far the best methods of other countries could be applied to this Dominion, together with a short account of the early history of the industry, showing the difficulties encountered in establishing the trade, financial conditions of other countries, centralization, de-centralization, trusts and monopolies and other matters connected with the business. It clearly pointed out that to successfully build up an export trade in chilled meat it must be operated in conjunction with the whole packing-house industry. To divorce the two industries at this stage of the country's development would be just as sensible as a butcher starting in one of the small towns of the west and handling and selling only the products of one kind of animal. One must be in a position to treat to the best possible advantage every kind and quality of meat animal offering. At the commencement of operations, until many of the farmers were educated as to what constituted a finished animal, no doubt only a small percentage would be suitable for exporting in a chilled state, the balance would in part be used for the local trade, and the remainder worked up into the various forms of packing-house products.

The plan recommended for adoption by this country was in the nature of several large and complete establishments working in conjunction with a considerable number of smaller works or feeders, distributed as widely as possible throughout the stock-raising portions of the country. By adopting this method, the necessary capital would be distributed and employed to the best advantage, and an even balance maintained between excessive centralization on the one hand and too wide a distribution of independent works, resulting in a lack of cohesion, on the other. It would develop the industry on an equitable basis in all the various stock-raising districts, with the greatest benefit to the whole country, thus assisting to the fullest extent the agricultural and pastoral industries throughout the Dominion.

The large central establishments would be placed or located at suitable points of railway convergence, and would be complete in every detail for the handling and treating of every kind of meat animal and their by-products. They would draw some of their supplies of stock from the surrounding country and would also be largely supplied by the smaller works or feeders. These smaller works or feeders would be provided with the necessary appliances for the slaughtering, chilling of the carcass and the working up of certain of the by-products. They would be located in any district where

sufficient cattle and hogs were obtainable or likely to be forthcoming in the near future, thus providing a market at the very doors of the farmer, and allowing of the stock being slaughtered near their own pastures, thus obviating travelling long distances on the hoof, and the consequent knocking about, deterioration in quality and loss in weight inseparable from so doing. It simply means the most business-like and economical manner of treating the raw material on the spot, and the building up of the industry entirely in the interests of Canada and for the Canadians. These small works would be designed in such a way as to allow of their being added to and extended as the business grew, and each would form the nucleus of a complete packing plant and develop into it just as speedily as the particular districts proved themselves capable of supporting a larger establishment. They would then in turn, themselves, throw out feeders and obtain some of their supplies from this source, and so their capabilities and numbers would extend and multiply, until the whole country was covered with a net work of chilling and packing plants.

The method suggested for financing the undertaking was, briefly, that the government should guarantee three-quarters of the capital required, and thus allow of that portion of the money being obtained cheaply, which is absolutely essential to build up the industry in a sound and permanent manner. The aim and object of this business must be the providing of a profitable market for everything the farm can produce, rather than the paying of dividends. If our sole desire were centered upon the paying of dividends, you or I or anybody else would probably do what is being done largely in the country to-day, give a big price when there was precious little coming forward and take it out of the farmers when they had anything to offer; fill up our stores with cheap meat in the fall and sell it at a greatly increased price in the spring, and be in the position to dictate to the man who has had sufficient pluck to feed a few head through the winter, as to what price he shall be paid for his stock; but is that the manner in which to build up the live stock industry of this country? Certainly not; but it is the way to pay dividends. Cheap money is essential to build up the industry on proper lines and it can only be obtained by having the government's guarantee. The government would have excellent security in the works, plant and other assets of the organization. The balance of the capital required would only be entitled to a reasonable rate of interest, and after the interest on the capital invested had been paid, any further profits obtained from the manufacture and marketing of the finished products would be divided between the unsecured shareholder and the producer of the stock *pro rata* to value of stock sold to organization, thus introducing the co-operative principle. As the producer, in addition to obtaining the highest market price for his stock, would further participate in all profits after a reasonable interest had been paid, he would thus, without putting any money into it, be given an interest in the concern, and would be obtaining his fair share in the benefits to be derived from the establishment and development of the industry. A certain measure of government control was recommended so that the interests of the producer would be protected for all time. In whatever manner it is decided to finance and operate the business, I maintain it must be in such a way as to obtain the confidence of the man who could and would produce if it were certain to be worth his while. A man is of little use to the country when he is only growing a few cattle and hogs just because he is obliged to, to live. By the establishment of this industry we want to stimulate production to such an extent that every one will be turning off his place the maximum number his particular ranch or farm is capable of producing. Price alone will not accomplish this, it can only be achieved by having some form of co-operation between the industry and the producer.

The only thing which can put new life and vigour into the live stock industry is a steady and profitable market, and the only means of obtaining this is by the establishment of a thoroughly organized chilling and packing-house industry, developed on sound business-like lines, under the control of the government, and with the producer properly protected.

Another point which I may perhaps touch upon, and that is that to make this business an unqualified success, it will be necessary to have every link in the chain complete between the producer and the consumer in Great Britain. The estimate of cost, prepared by the Beef Commission, included not only the works but also suitable refrigerator cars and storage accommodation at the ports of shipment. This does not mean that this storage accommodation must be immediately provided, as no doubt, to commence with, arrangements could be made with existing concerns for a portion of their space, but provision must be made in the estimates for the actual owning of this important link in the chain of operations as soon as the business warrants it. The same applies to the sale of the meat in Great Britain. One must be in a position to go to the actual consumer with the goods. This was done by the States, and it is quite possible and even desirable that we should do the same, not at the very commencement of operations, but as soon as the business was well on its feet, and the amount being sent justified it. Think what a splendid advertisement it would mean for this country to have shops selling Canadian produce throughout Great Britain. As I pointed out to the late Minister of the Interior years ago, it would be a practical form of advertising, and would be worth far more than all the literature it was possible to publish and distribute. It would appeal in a most convincing manner to the very class of immigrant we are mostly in need of,—the small farmer with a little capital, who is essentially a lover of stock. At the present when one of this class of men thinks of leaving the old country for one or other of the less congested portions of the world, it is not to Canada he thinks of going, for the reason that he looks on this country as purely a grain country. He never sees Canadian meats. What cattle are shipped from this country are slaughtered at the port, and lose their identity as Canadian meat, whereas he daily sees the Australian, New Zealand and Argentine article exposed for sale, and naturally feels that a country which can produce such stock is good enough for him to make his home in. Place choice Canadian beef before him in a similar convincing manner and this country would gather in probably 75 per cent of these very desirable citizens who are now going to far more distant parts of the empire and other portions of the world.

Again, to have another outlet would be invaluable as a mere matter of insurance against the danger, always present, even if remote, of having the markets of every country closed to the imports of cattle from the Dominion should any infectious disease show itself in the herds of this country, and no country can afford to consider itself immune from such a contingency.

The establishment of this industry would be of enormous and far-reaching importance in the development of true and lasting agriculture. I know what it has done for other countries and have taken a leading part in the inauguration and development in those countries. One has only to look to the States, where conditions are somewhat similar, and where it has been of great importance in the building up of agriculture, even handicapped as it has been by the evils of the meat trust, to realize of how much greater worth would it be to this Dominion if established under the absolute control of the government and on the lines I have indicated. It would remove the black cloud which has been constantly darkening the farmers horizon for years past, and make his calling a far more certain and profitable one.

What is the position on the land to-day. There are hundreds doing little or nothing to produce anything, and there are again hundreds of others who are gambling in the growing of wheat, knowing full well that in many cases the odds are greatly against their obtaining a marketable crop. There is now no inducement to go into anything else, but provide these men with a certain profitable outlet for stock and a very different aspect will come over the scene. Those within easy reach of the works would quickly develop into finishers of stock, and those further removed, into breeders and growers of the stores. There would soon be thousands of both cattle and hogs produced where not one is forth-coming to-day, and agriculture would then

be placed upon a true and permanent foundation. That is what we want to aim for in the establishment of this chilled meat trade, and which will do all this, and go far to fill the vacant places of this country with a prosperous and contented people.

Bold and vigorous measures are necessary not only to remedy the existing conditions and check the present languishing state of the live stock industry, but also to place this most important branch of agriculture on a sound and permanent footing for all time. The production and finishing of live stock is the very back bone of real and lasting agriculture, and agriculture is the main and permanent foundation upon which the future progress and prosperity of this country entirely depends; therefore, the placing of the live stock industry on a sound, profitable, and durable basis, is the most important problem claiming the immediate attention of the government at the present time.

This question of establishing a meat export trade received some attention at the last convention, but at that time no scheme of a practical nature had been placed before the Minister of Agriculture, and I gathered from the report of the convention that Mr. Fisher was of opinion that it was advisable to wait until greater numbers of well finished animals were forthcoming before embarking in the business. There can now be no possible doubt that the quality and quantity of stock required will never be forthcoming to any great extent until the market for same is assured. Given an outlet, such as the establishment of this industry on the sound lines suggested would provide, there would be no reason to fear lack of either numbers or quality. With the inauguration of this industry in the manner suggested, a big change will come over the scene. The rancher and farmer, no longer confined, restricted, and afraid to launch out, but at once assured of a steady and remunerative market for his stock, will embark in the business of producing with something approaching zest, and greater activity and consequent prosperity will be manifest on all sides. The future of the live stock industry under its stimulating influence is big with possibilities. The wonderful resources of the country from a meat-producing standpoint, so long neglected and practically unexploited, will be given scope, and will eventually and very rapidly become one of the country's greatest assets.

I believe at the last convention you were asked to guarantee the supply of a large number of stock towards the establishment of this industry. I maintain, and I speak with a thorough practical knowledge of the industry and what it has done towards building up the live stock business in every country in which it has been adopted, I say that guarantees to supply stock are useless, and in most cases not worth the paper they are written on. I have had experience of them, when I was in charge of the P. F. A. business in Australia years ago, which was the largest business of its kind in that country, and, as giving you some idea of its magnitude, I may say that in one year I handled over a million sheep besides large numbers of cattle, hogs and other refrigerated produce. At one time we were disposed to erect works in any centre where the farmers would guarantee 50,000 head of sheep or the equivalent in cattle, hogs or other goods, but we soon found that the best guarantee we could have that the necessary stock would be forthcoming, was the price to the producer, and the same applies to every country. The farmer is not going to provide the raw material unless it pays him to do so, and as long as conditions remain as they are, it is only a waste of time and energy to continue to exhort him to do so.

The whole question resolves itself into this, if through the establishment of this industry, a steady and profitable outlet can be obtained for every head of stock the country is capable of producing, then its establishment would be big and far-reaching in its effect on the live stock industry, and on the future progress and prosperity of the whole Dominion, and those responsible would have their names handed down to posterity as having achieved something of real and lasting good for true and permanent agriculture. On the other hand, if this business will not provide this profitable and steady outlet, sufficient to stimulate the production and finishing of great

numbers of stock, then it is not worth touching, no, not even with a barge pole. I maintain, however, that the report of the Chilled Meat Committee is in itself sufficient to prove to any unbiased person, who will give the matter serious and intelligent consideration, that it will undoubtedly provide the market looked for, and prove of untold worth not only to the rancher and farmer, but to the whole Dominion.

What has been accomplished by other countries, and the States for example, can be accomplished by Canada. The States have been shipping for years past something like 30 million dollars worth of chilled beef alone to the British market, and I say there is nothing whatever to prevent this country building up in a very few years a trade of equal dimensions. There is only an imaginary line separating the two countries, and we on this side are just as capable of producing and finishing stock as they are on the other side, if we are given the opportunity. We have not their corn, but we have in our barley and oats, just as good, if not better food, and can produce it as cheaply as any country in the world, and its feeding value, even when frosted, is well illustrated by the experiments which have been made at the Government farm at Lacombe.

There is another matter I would like to touch upon for just a moment, and that is the relation of this industry to the present live cattle export trade and existing packing houses. Now, no one imagines for one moment that the establishment of this other outlet would kill the present live cattle export trade. That it would, however, provide a better and more satisfactory market is undeniable. As proof of this it is only necessary to again look at the States, where the business during the past twenty years has grown from nothing to about 30 million dollars worth per annum, whereas the live cattle exports have remained practically stationary during the same period. We have in this a very clear indication as to which method of exporting is considered the more satisfactory of the two in that country.

Many engaged in the export of live cattle, have been averse to seeing this industry established, fearing, no doubt, a curtailment of their own operations. Now, what is their position, if things continue much longer as at present,—they will soon have little or nothing at all to handle, and I maintain that the inauguration of this meat export trade will stimulate production to such an extent, that the heavy weight alone (which it may always pay to send alive) would outnumber those of all weights which are exported now. The same applies to the existing packing houses; they will participate in the increased production, and thus be able to keep their works running more continuously throughout the year, and later on, when the exporting of chilled meat is thoroughly organized and under way, they will be able to come into the business, without it having cost them one cent towards its establishment. The natural obstacles which beset the path leading to the establishment of his industry, are big enough, and ugly enough, without the creation of any artificial fences of any kind.

There are many other matters which I might touch upon, such as the effect of this business upon the building up within the Dominion of numerous subsidiary industries, which are dependent upon the packing house for their raw material, also the manner in which it would increase the earning powers of the railways and materially help towards paying the interest on the vast sums which have and are still being spent to develop the country. I feel, however, that I have already spoken at far too great a length, and in concluding I would just like to say that this modern and scientific method of marketing has been successfully adopted by every other country of importance in the world, and it is indispensable towards providing the necessary stability in the live stock industry within the Dominion. It is absolutetly essential as a means of giving the required stimulus to the business of producing. It will make it worth the farmers while to take up the business with something approaching animation, and seriously embark on not only the production but also the finishing of their stock. The business of producing as existing at present is too precarious. The question of a modern, business-like and up-to-date meat export trade has become acute.

No better incentive to produce and finish could be desired or given than the steady and profitable outlet this industry would provide, and under its influence we should soon be surprising the whole world with the capacity possessed by this country for the production of all kinds of meat animals.

The question, as I have always maintained, must be looked at very broadly, the difficulties we encounter, will, I feel confident, not prove insurmountable. It is well to remember that every great scheme seems at first impossible of accomplishment. Difficulties, however, when faced boldly have a way of disappearing. There must, however, be a readiness on all sides to put aside local interests and prejudices for the national well-being. Failure would be certain if the matter were approached in a narrow and petty spirit, and if the sole desire were centered upon securing something for one portion of the Dominion alone, although the immediate field for operations is undoubtedly the west. Success on the other hand is, I feel, assured, if the business is grasped in a bold and fearless manner, and established and built up on a sound, business-like and equitable foundation.

Already I see, in my mind's eye, the whole country dotted with chilling and packing plants, and the people on the land far more contented and prosperous, strenuously and intelligently working in the development of the immense natural resources of the land, and making this country not only the granary, but also the larder of Great Britain. It is an ideal worthy of a great effort, both on the part of the government and all those having the welfare of the country at heart, but let me tell you, gentlemen, it can only be attained by unity of purpose. We shall succeed just so far as we fix our eyes upon the ideal we have before us, and dismiss from our minds any petty jealousies and parochialisms which see no further than the province in which they reside. Let us all join forces and make this industry big and far-reaching for the live stock industry of the whole Dominion, and something worthy of accomplishment by any government for the lasting benefit of real and permanent agriculture.

Mr. A. W. Smith.—Mr. Chairman,—As chairman of the Resolutions Committee, I beg to submit for the consideration of the convention the following resolution: 'Moved by Robert Miller, seconded by Capt. T. Robson, that the words 'resident in Canada' be inserted in or added to the regulation now governing the importation of pure-bred animals into Canada.'

Mr. Robert Miller.—I will now move that this resolution be adopted by this convention.

(Motion seconded by Mr. Smith.)

Col. McCrae.—Mr. Miller showed us that there were some Americans who were not residents of Canada and they had 'stool pigeons' in this country who acted for them. I think there is just as much need to stop that sort of thing as there is to prevent our fellow British subjects in England and Scotland sending horses to this country. In fact, I think there is more need of it. I really feel that there is as much need of stopping the 'stool pigeon' business as there is the other.

The Chairman.—I am not supposed to give my views, but if I were allowed to it would be a hardship to me, because I have asked that horses be sent out to me from the old land and if this resolution was passed they would not come.

Mr. Miller.—Yes, they would. You would be the importer.

(Motion put to the meeting and carried.)

Dr. Rutherford.—We have with us Mr. A. W. Smith, whose name is down for a paper on 'Live Stock Registration.' Mr. Smith does not desire to read his paper because he knows you are tired and that the audience is getting small, and I wish to

move that Mr. Smith's paper be printed as part of the proceedings of this convention and embodied in this report.

(Motion seconded by Dr. English, of Hamilton, and carried.)

Dr. RUTHERFORD.—I am informed by the new president that he thinks it is most essential that the members of the Executive Committee should hold a meeting to-morrow. We have only had two days at this convention and many of you have come a very great distance. We have got through a great deal of work, but we have not done all that ought to have been done.

Mr. ANDREW GRAHAM.—I do not know that I have anything to say in addition to what has been said. It is thought best to have a directors' meeting to-morrow.

Mr. ROBERT MILLER.—I would like to move a vote of thanks to the chairman who has presided so well at this meeting. He always does things well and we want him to retire knowing that he has the good-will of everybody and we all appreciate the work he has done.

Capt. ROBSON.—I have very much pleasure in seconding that motion. I must congratulate the president on the very nice address he gave us. It was short and right to the point.

(Motion put to the meeting and carried with applause.)

Mr. ANDREW GRAHAM.—I have very much pleasure in conveying to you, sir, this hearty vote of thanks for the able way in which you have presided at our meetings.

Mr. ROBERT NESS.—I thank you very much for the kind way in which you have shown your sympathy to me, knowing my shortcomings have been many, but my intentions were good and if I failed it was not for want of trying. I thank you very much for your kindness at this time and bid you Godspeed.

Convention closed.

APPENDIX No. 22.

SEVENTH ANNUAL REPORT OF THE RECORD COMMITTEE TO THE RECORD BOARD AND RECORD ASSOCIATIONS.

RECORD COMMITTEE, 1911-1912.

A. W. Smith, Maple Lodge, Ont., Chairman.
John Bright, Myrtle Station, Ont., Representing Heavy Horses.
W. J. Starr, Toronto, Ont., Representing Light Horses.
Robert Miller, Stouffville, Ont., Representing Beef Cattle.
Hon. N. Garneau, Quebec, Que., Representing Dairy Cattle.
J. M. Gardhouse, Weston, Ont., Representing Sheep.
J. E. Brethour, Burford, Ont., Representing Swine.
John W. Brant, Ottawa, Ont., Secretary-Treasurer.

Containing the financial statement of the Record Committee for the year 1911, a statement of the transactions and financial statement for each individual Association, and other general information.

FINANCIAL STATEMENT.

FOR THE YEAR ENDING DECEMBER 31ST, 1911.

Receipts.

	$ cts.	$ cts.
Balance on hand December 31st, 1910		3,631 74
Dominion Government Grant, 1911		7,000 00
Dominion Swine Breeders' Association—		
Levy for salaries, 1911	1,200 00	
Adjustment of charges, 1910	114 80	
Overcharge on salaries, 1910	27 50	1,342 30
Dominion Sheep Breeders' Association—		
Adjustment of charges, 1910	525 99	525 99
Dominion Shorthorn Breeders' Association—		
Levy for salaries, 1911	3,249 96	
Levy for refunds, 1911	480 00	3,729 96
Canadian Ayrshire Breeders' Association—		
Levy for salaries, 1911	600 00	600 00
Canadian Hereford Breeders' Association—		
Levy for salaries, 1911	360 00	360 00
Canadian Jersey Cattle Club—		
Adjustment of charges, 1910	196 45	196 45
North American Galloway Association—		
Adjustment of charges, 1910	20 75	20 75
Canadian Aberdeen Angus Association—		
Adjustment of charges, 1910	186 93	186 93
French Canadian Cattle Breeders' Association—		
Adjustment of charges, 1910	88 19	88 19
Canadian Red-Polled Association—		
Adjustment of charges, 1910	40 07	40 07
Clydesdale Horse Association of Canada—		
Levy for salaries, 1911	2,389 00	
Levy for refunds, 1911	480 00	
Adjustment of charges, 1910	1,082 96	3,942 96
Canadian Shire Horse Association—		
Adjustment of charges, 1910	61 39	61 39
Canadian Hackney Horse Society—		
Adjustment of charges, 1910	103 80	103 80
French Canadian Horse Breeders' Association—		
Adjustment of charges, 1910	59 02	59 02
Canadian Percheron Horse Breeders' Association—		
Adjustment of charges, 1910	345 26	345 26
Canadian Belgian Draught Horse Breeders' Association—		
Adjustment of charges, 1910	58 02	58 02
Canadian Thoroughbred Horse Society—		
Adjustment of charges, 1910	99 00	99 00
Canadian Pony Society—		
Adjustment of charges, 1910	29 19	29 19
Received for import certificates	1,622 87	1,622 87
Total		24,043 89

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

RECORD BOARD, 1911-1912.

Representing Dominion Swine Breeders' Association.—Jos. E. Featherstone, Streetsville, Ont.; J. E. Brethour, Burford, Ont.

Dominion Sheep Breeders' Association.—Lt.-Col. D. McCrae, Guelph, Ont.; R. H. Harding, Thorndale, Ont.

Dominion Shorthorn Breeders' Association.—Robert Miller, Stouffville, Ont.; A. W. Smith, Maple Lodge, Ont.; J. M. Gardhouse, Weston, Ont.; W. G. Pettit, Freeman, Ont.; H. Smith, Exeter, Ont.; W. A. Dryden, Brooklin, Ont.; Peter White, Pembroke, Ont.

Dominion Ayrshire Breeders' Association.—W. W. Ballantyne, Stratford, Ont.; W. F. Stephen, Huntingdon, Que.

Canadian Hereford Breeders' Association.—H. D. Smith, Hamilton, Ont.; R. J. Mackie, Oshawa, Ont.

Canadian Jersey Cattle Club.—R. Reid, Berlin, Ont.; L. J. C. Bull, Brampton, Ont.

North American Galloway Association.—Robt. Shaw, Brantford, Ont.; Lt.-Col. D. McCrae, Guelph, Ont.

Canadian Aberdeen Angus Association.—James Bowman, Guelph, Ont.; F. J. Collyer, Welwyn, Sask.

Canadian Guernsey Breeders' Association.—D. J. Mackay, Heath Bell, N.S.; H. W. Corning, Cheggogin, N.S.

French Canadian Cattle Breeders' Association.—Arsene Denis, St. Norbert, Que.; T. B. Macaulay, Montreal, Que.; Hon. N. Garneau, Quebec, Que.

Canadian Red-Polled Association.—W. J. McComb, Beresford, Man.; Dr. A. W. Bell, Winnipeg, Man.

Clydesdale Horse Association of Canada.—Jno. Bright, Myrtle Station, Ont.; Robt. Graham, Bedford Park, Ont.; Wm. Smith, Columbus, Ont.; Jno. A. Boag, Queensville, Ont.; Peter Christie, Manchester, Ont.

Canadian Shire Horse Association.—James Henderson, Belton, Ont.; John Gardhouse, Highfield, Ont.

Canadian Hackney Horse Society.—W. C. Renfrew, Bedford Park, Ont.; T. A. Graham, Claremont, Ont.

French Canadian Horse Breeders' Association.—Robt. Ness, Howick, Que.; J. A. Couture, Quebec, Que.; Arsene Denis, St. Norbert, Que.

Canadian Percheron Horse Breeders' Association.—Geo. Lane, Calgary, Alta.; R. P. Stanley, Moosomin, Sask.

Canadian Belgian Draught Horse Breeders' Association.—Paul Tourigny, Victoriaville, Que.; J. Arthur Paquette, Quebec, Que.

Canadian Standard Bred Horse Society.—J. Wesley Allison, Morrisburg, Ont.; Geo. Pepper, Toronto, Ont.

Canadian Thoroughbred Horse Society.—Wm. Hendrie, Hamilton, Ont.; R. W. Davies, Todmorden, Ont.

Canadian Pony Society.—W. J. Stark, Toronto, Ont.; A. E. Major, Whitevale, Ont.

Canadian Suffolk Horse Society.—J. A. W. Fraser, Cochrane, Alta.; Norman Jaques, Ingleton, Alta.

Canadian French Coach Horse Society.—J. E. Goddard, Cochrane, Alta.; C. R. de la Vergne, Glenbow, Alta.

CANADIAN RECORD ASSOCIATIONS.

NAME OF ASSOCIATION.

Dominion Swine Breeders' Association.—A. P. Westervelt, secretary, Parliament Buildings, Toronto, Ont.

Dominion Sheep Breeders' Association.—A. P. Westervelt, secretary, Parliament Buildings, Toronto, Ont.

Dominion Shorthorn Breeders' Association.—W. G. Pettit, secretary, Freeman, Ont.

Canadian Ayrshire Breeders' Association.—W. F. Stephen, secretary, Huntingdon, Ont.

Canadian Hereford Breeders' Association.—R. J. Mackie, secretary, Oshawa, Ont.

Canadian Jersey Cattle Club.—R. Reid, secretary, Berlin, Ont.

North American Galloway Association.—Lieut.-Col. D. McCrae, secretary, Guelph, Ont.

Canadian Aberdeen Angus Association.—W. I. Smale, secretary, Brandon, Man.

Canadian Guernsey Breeders' Association.—H. W. Corning, secretary, Cheggogin, N.S.

French Canadian Cattle Breeders' Association.—J. A. Couture, D.V.S., secretary, 49 Garden St., Quebec, Que.

Canadian Red-Polled Association.—Dr. A. W. Bell, secretary, 160 Princess St., Winnipeg, Man.

Clydesdale Horse Association of Canada.—J. W. Sangster, secretary, 12 Wellington St. E., Toronto, Ont.

Canadian Shire Horse Association.—G. de W. Green, secretary, 58 Grenville St., Toronto, Ont.

Canadian Hackney Horse Society.—H. M. Robinson, secretary, 49 Colborne St., Toronto, Ont.

French Canadian Horse Breeders' Association.—Dr. J. A. Couture, D.V.S., secretary, 49 Garden St., Quebec, Que.

Canadian Percheron Horse Breeders' Association.—F. R. Pike, secretary, High River, Alta.

Canadian Belgian Draught Horse Breeders' Association.—J. A. Paquette, secretary, Department of Agriculture, Quebec, Que.

Canadian Standard Bred Horse Society.—Jno W. Brant, secretary, Ottawa, Ont.

Canadian Thoroughbred Horse Society.—J. J. Dixon, secretary, King and Jordan St., Toronto, Ont.

Canadian Pony Society.—W. J. Stark, secretary, 12 Wellington St. E., Toronto, Ont.

Canadian Suffolk Horse Society.—Arch. Jaques, secretary, Lamerton, Alta.

Canadian French Coach-Horse Breeders' Association.—E. L. Richardson, secretary, Calgary, Alta.

Expenditures.

Dominion Shorthorn Breeders' Association—		
Adjustment of charges, 1910		$ 624 19
Canadian Ayrshire Breeders' Association—		
Adjustment of charges, 1910		87 99
Canadian Hereford Breeders' Association—		
Adjustment of charges, 1910		159 07
Audit, Geo. L. Blatch		100 00
Refund of excess of fees		1,166 78
Expenses of Record Committee		503 43
Petty Expenses		103 51
Insurance		41 67
Printing		232 00
Telephone and Telegraph		68 25
Salaries in Record Office :—		
Jno. W. Brant	$2,500 00	
R. G. T. Hitchman	1,500 00	
H. E. Martinette	1,625 00	
E. J. Bartlett	1,300 00	
A. R. Dawson	900 00	
C. Murray	625 00	
S. Kennedy	800 00	
R. J. Allen	800 00	
H. Patterson	339 00	
I. Larose	650 00	
A. M. Day	650 00	
I. B. Moodie	433 33	
N. E. Moodie	550 00	
R. E. LeGendre	450 00	
D. M. Milroy	180 00	
E. M. Battle	325 00	
A. M. Gunderson	450 00	
I. Lemoine	350 00	
A. V. Roy	205 00	
A. A. Duncan	96 00	
J. A. Robson	390 00	
Temporary Assistance	119 05	
Owing from 1910	27 50	15,264 33
		$18,406 77
Balance in Bank December 31st, 1911		5,627 12
Office Cash		10 00
		$24,043 89

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

DOMINION SWINE BREEDERS' ASSOCIATION.

Organized 1889. Incorporated under Ontario Agricultural and Arts Act, 1895. Incorporated at Ottawa, July 31st, 1905. Head Office, Toronto, Ont.

OFFICERS FOR 1911.

President ..... William Jones, Zenda, Ont.
Vice-President ..... George Douglass, Mitchell, Ont.
Secretary-Treasurer ..... A. P. Westervelt, Toronto, Ont.

DIRECTORS.

S. Dolson, Norval, Ont.
J. E. Brethour, Burford, Ont.
D. DeCoursey, Bornholm, Ont.
W. M. Smith, Scotland, Ont.
A. C. Hallman, Breslau, Ont.
Joseph Featherston, Streetsville, Ont.
James O'Neil, Birr, Ont.
Prof. G. E. Day, Guelph, Ont.
John Flatt, Millgrove, Ont.

Membership 1911, 573.
Herd Books published, Volumes 1 to 22 inclusive.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. & New Certificates	Membership Rec.
7,136	732	40	$1,090 00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup. & New Certificates.	Membership received.
				$
Ontario	3,210	333	22	398 00
Manitoba	945	89	5	114 00
Saskatchewan	357	34	3	60 00
Alberta	525	62	2	102 00
British Columbia	179	31	1	36 00
Quebec	1,566	160	6	306 00
New Brunswick	159	11	1	24 00
Nova Scotia	78	5		22 00
Prince Edward Island	99	3		20 00
United States	18	4		8 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Dominion Swine Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$5,330 45
Interest	126 25
Credits outstanding, $101.55.	$5,456 70

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING SWINE RECORD.

Receipts.

Received from Association to pay Salaries, 1911	$1,200 00
From Record Committee Fund	423 81
Balance owing to Record Committee by Association	113 47
Error in Charges, 1910	27 50
	1,764 78

Expenditures.

Salaries to December 31st, 1911	$1,651 85
Refunds to December 31st, 1911	102 37
Audit to December 31st, 1911	10 56
	$1,764 78

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

SESSIONAL PAPER No. 15b

DOMINION SHEEP BREEDERS' ASSOCIATION.

Incorporated October 25th, 1905. Head Office, Toronto, Ont.

OFFICERS FOR 1911.

President.....Lt.-Col. D. McCrae, Guelph, Ont.
Vice-President.....J. E. Cousins, Harriston, Ont.
Secretary-Treasurer.....A. P. Westervelt, Toronto, Ont.

DIRECTORS.

John Rawlings, Forest, Ont.....R. H. Harding, Thorndale, Ont.
James Snell, Clinton, Ont.....John Kelly, Shakespeare, Ont.
L. Parkinson, Eramosa, Ont.....Prof. G. E. Day, Guelph, Ont.
J. A. Cerswell, Bond Head, Ont.....John Campbell, Woodville, Ont.
W. A. Dryden, Brooklin, Ont.....Andrew Whitelaw, Guelph, Ont.
John Jackson, Abingdon, Ont.

Membership 1911, 315.
Flock Books published, Volumes 1 and 2.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
2,856	664	17	$310.00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
				$
Ontario	1,329	66	1	96 00
Manitoba	174	28		16 00
Saskatchewan	72	83		7 00
Alberta	145	37		9 00
British Columbia	49	26		6 00
Quebec	957	401	5	160 00
New Brunswick	30	2	2	5 00
Nova Scotia	21			1 00
Prince Edward Island	18	5		2 00
United States	61	16	9	8 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Dominion Sheep Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$2,161 65
Interest	52 60
	$2,214 25

Credits outstanding, $102.20.

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING SHEEP RECORD.

RECEIPTS.

From Record Committee Fund	$192 73
Balance owing to Record Committee by Association	649 78
	$842 51

EXPENDITURES.

Salaries to December 31st, 1911	$779 44
Refunds to December 31st, 1911	58 75
Audit to December 31st, 1911	4 32
	$842 51

(Sgd.) JNO. W. BRANT, *Accountant.*

(Sgd.) GEO. L. BLATCH, F.C.A., *Auditor.*

DOMINION SHORTHORN BREEDERS' ASSOCIATION.

Organized January 12th, 1886 (amalgamation of Canada and British North American Herd Book Associations). Incorporated under Ontario Agricultural and Arts Act, 1887. Incorporated at Ottawa, January, 1901. Head Office, Toronto, Ont.

OFFICERS FOR 1911.

President.....Peter White, K.C., Pembroke, Ont.
Vice-President.....Harry Smith, Exeter, Ont.
Second Vice-President.....P. M. Bredt, Regina, Sask.
Secretary-Treasurer.....W. G. Pettit, Freeman, Ont.

DIRECTORS.

William Smith, M.P., Columbus, Ont.....J. M. Gardhouse, Weston, Ont.
J. G. Barron, Carberry, Man.....A. Edward Myer, Guelph, Ont.
J. F. Mitchell, Burlington, Ont.....John Gardhouse, Highfield, Ont.
J. G. Washington, Ninga, Man.....J. T. Gibson, Denfield, Ont.
John Isaac, Markham, Ont.....J. A. Watt, Salem, Ont.
W. A. Dryden, Brooklin, Ont.....James Leask, Greenbank, Ont.
W. D. Cargill, Cargill, Ont.....C. A. Archibald, Truro, N.S.
S. Dyment, Barrie, Ont.

Membership 1911, 2,056. Herd Books published, Volumes 1 to 23 inclusive.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
*7,430	2,639	230	$3,082 00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
				$
Ontario	4,742	1,541	114	2,054 00
Manitoba	1,061	353	41	474 00
Saskatchewan	454	239	29	156 00
Alberta	535	322	34	214 00
British Columbia	14	11	1	22 00
Quebec	279	81	9	92 00
New Brunswick	45	21		20 00
Nova Scotia	119	63		42 00
Prince Edward Island	30	6	1	6 00
United States	151	2	1	2 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Dominion Shorthorn Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$11,093 54
For Herd Books	14 00
From W. G. Pettit for deposit	624 19
Interest	133 85
Credits outstanding, $311.90.	$11,865 58

SESSIONAL PAPER No. 15b

RECEIPTS AND EXPENDITURES.

For Conducting Shorthorn Record.

Receipts.

Received from Association to pay Salaries, 1911	$3,249 96
Received from Association to pay Refunds, 1911	480 00
From Record Committee Fund	651 64
	$4,381 60

Expenditures.

Salaries to December 31st, 1911	$3,576 74
Refunds to December 31st, 1911	291 82
Audit to December 31st, 1911	23 21
Insurance	14 62
Balance owing to Association by Record Committee	475 21
	$4,381 60

*136 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT.
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION.

Organized March 10th, 1898, by amalgamation of the Canadian Ayrshire Breeders and Importers' Association established 1870 and the Dominion Ayrshire Breeders' Association established 1872. Incorporated under Ontario Agricultural and Arts Act.

Incorporated at Ottawa, Ont., 1905. Head Office, Huntingdon, Que.

OFFICERS AND DIRECTORS 1911.

Hon. President.....Dr. J. G. Rutherford, Ottawa, Ont.
President.....John McKee, Norwich, Ont.
Vice-President.....Hector Gordon, Howick, Que.
Secretary-Treasurer.....W. F. Stephen, Huntingdon, Que.

DIRECTORS.

WESTERN:
A. Hume, Menie, Ont.
John McKee, Norwich, Ont.
W. W. Ballantyne, Stratford, Ont.
Robert Hunter, Maxville, Ont.
A. Kains, Byron, Ont.
William Stewart, Menie, Ont.
N. Dyment, Clappison's Cors., Ont.

EASTERN:
R. R. Ness, Howick, Que.
Hon. Wm. Owens, Montreal, Que.
N. Lachapelle, St. Paul l'Ermite, Que.
James Bryson, Brysonville, Que.
Hector Gordon, Howick, Que.
P. D. McArthur, N. Georgetown, Que.
G. C. P. McIntyre, Sussex, N.B.

Membership 1911, 781.
Herd Books published, 21 (Canada 5, Dominion 3, Canadian 13).

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
2,833	1,254	49	$834 00

DISTRIBUTION BY PROVINCES.

——	Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
				$
Ontario	1,063	485	12	304 00
Manitoba	51	28	1	22 00
Saskatchewan	18	9		10 00
Alberta	87	66	2	42 00
British Columbia	54	18	3	14 00
Quebec	1,331	519	24	366 00
New Brunswick	120	51	1	30 00
Nova Scotia	80	56		36 00
Prince Edward Island	24	20		8 00
United States	5	2	6	2 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Ayrshire Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$4,766 30
For Herd Books	4 00
Interest	50 00
Credits outstanding, $141.55.	$4,820 30

SESSIONAL PAPER No. 15b

RECEIPTS AND EXPENDITURES.

For Conducting Ayrshire Record.

Receipts.

Received from Association to pay Salaries, 1911	$ 600 00
From Record Committee Fund	368 05
Balance owing to Record Committee by Association	181 66
	$1,149 71

Expenditures.

Salaries to December 31st, 1911	$1,096 92
Refunds to December 31st, 1911	33 94
Audit to December 31st, 1911	9 54
Insurance	9 31
	$1,149 71

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.
Auditor

CANADIAN HEREFORD BREEDERS' ASSOCIATION.

Incorporated 1905. Head Office, Oshawa, Ont.

OFFICERS FOR 1911.

President.....H. D. Smith, Hamilton, Ont.
Vice-President.....L. O. Clifford, Oshawa, Ont.
Secretary-Treasurer.....R. J. Mackie, Oshawa, Ont.

DIRECTORS.

W. H. Harrison, Mount Albert, Ont.
H. J. Reid, Epping, Ont.
T. B. Aitken, Teeswater, Ont.
Frank B. Harrison, Mount Albert, Ont.
R. W. Stutt, Forest, Ont.
Alfred Stone, Guelph, Ont.
A. S. Hunter, Durham, Ont.
Asa Warnica, Painswick, Ont.
A. F. O'Neil, Southgate, Ont.
R. J. Penhall, Villa Nova, Ont.
Henry Reid, Mimosa, Ont.
William Gillies, Robb, Ont.

Membership 1911, 237.
Herd Books published, Volumes 1 to 16 inclusive.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations	Transfers.	Dup. & New Certificates.	Membership Rec.
*1,295	340	11	$330 00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
Ontario	420	172	5	$170 00
Manitoba	186	47	...	80 00
Saskatchewan	309	61	...	32 00
Alberta	278	48	6	68 00
British Columbia	67	1	...	4 00
Quebec	9	10	...	4 00
Nova Scotia	8	1	...	4 00
United States	18	...	...	18 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Hereford Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$1,672 52
Interest	40 45
	$1,712 97

Credits outstanding, $62.95.

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING HEREFORD RECORD.

Receipts.

Received from Association to pay Salaries, 1911	$ 360 00
From Record Committee Fund	148 54
	$ 508 54

Expenditures.

Salaries to December 31st, 1911	$ 442 81
Refunds to December 31st, 1911	8 58
Audit to December 31st, 1911	3 35
Balance owing to Association by Record Committee	47 81
Insurance	5 99
	$ 508 54

*459 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT, *Accountant.*

(Sgd.) GEO. L. BLATCH, F.C.A., *Auditor.*

SESSIONAL PAPER No. 15b

CANADIAN JERSEY CATTLE CLUB.

Organized June 15th, 1901. Incorporated February 11th, 1905.
Head Office, Toronto, Ont.

OFFICERS FOR 1911.

President.....David Duncan, Don, Ont.
Vice-Presidents—D. O. Bull, Toronto, Ont.; T. Porter, Toronto, Ont.; H. W. Edwards, Coaticook, Que.; H. S. Pipes, Amherst, N.S.; W. V. Edwards, Souris, Man.
Secretary-Treasurer.....R. Reid, Berlin, Ont.

DIRECTORS.

F. L. Green, Greenwood, Ont.
R. J. Fleming, Toronto, Ont.
S. J. Lyons, Norval, Ont.
B. A. Bull, Brampton, Ont.

Membership 1911, 174.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
715	336	9	$142 00

DISTRIBUTION BY PROVINCES.

—	Registration.	Transfers.	Dup. & New Certificates.	Membership Rec.
				$ cts.
Ontario	460	244	6	83 00
Manitoba	31	11		9 00
Saskatchewan	12	5	1	3 00
Alberta	22	15		4 00
British Columbia	39	20		11 00
Quebec	63	13	1	11 00
New Brunswick	49	13		7 00
Nova Scotia	25	10		11 00
Prince Edward Island	14	5	1	3 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Jersey Cattle Club.

January 1st to December 31st, 1911.

For registrations and memberships	$1,130 93
Interest	29 50
	$1,160 43

Credits outstanding, $51.85

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING JERSEY RECORD.

Receipts.

From Record Committee Fund	$ 97 32
Balance owing Record Committee by Jersey Club	02 39
	$ 299 71

Expenditures.

Salaries to December 31st, 1911	$ 289 37
Refunds to December 31st, 1911	8 08
Audit to December 31st, 1911	2 26
	$ 299 71

(Sgd.) JNO. W. BRANT, *Accountant.*

(Sgd.) GEO. L. BLATCH, F.C.A., *Auditor.*

NORTH AMERICAN GALLOWAY ASSOCIATION.

Organized November 24th, 1882. Incorporated, Ontario Agriculture and Arts Act, 1882. Incorporated at Ottawa, Ont., 1905. Head Office, Guelph, Ont.

OFFICERS FOR 1911.

President.....Robert Shaw, Brantford, Ont.
Secretary-Treasurer.....Lt.-Col. D. McCrae, Guelph, Ont.
Executive Committee—H. D. Irwin, Markdale, Ont.; John B. Telfer, Milton, Ont., John Duff, Rockwood, Ont.

Membership 1911, 16.
Herd Books published, Volume 1.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. & New Certificate.	Membership Rec.
38	6	.....	$12 00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. & New Certificates.	Membership Rec.
				$ cts.
Ontario	26	3		3 00
Manitoba	4			6 00
Saskatchewan	2	1		2 00
Alberta	6	2		1 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the North American Galloway Association.

January 1st to December 31st, 1911.

For registrations and memberships	$ 39 00
Interest	4 00
Credits outstanding, $1.75.	$ 43 00

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING GALLOWAY RECORD.

Receipts.

From Record Committee Fund	$ 4 43
Balance owing to Record Committee by Association	8 41
	$ 12 84

Expenditures.

Salaries to December 31st, 1911	$ 12 76
Audit to December 31st, 1911	0 08
	$12 84

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd,) GEO. L. BLATCH, F.C.A.,
Auditor.

SESSIONAL PAPER No. 15b

CANADIAN ABERDEEN ANGUS ASSOCIATION.

Organized 1906. Incorporated May 4th, 1906. Head Office, Winnipeg, Man.

Officers for 1911.

President..... J. D. McGregor, Brandon, Man.
Vice-President.....James Bowman, Guelph, Ont.
Secretary-Treasurer .....W. I. Smale, Brandon, Man.

Directors.

James Brown, Ellisboro, Sask. W. T. G. McClure, Innisfail, Alta.
Hon. W. Clifford, Austin, Man. John Turner, Calgary, Alta.
John Low, Elora, Ont.

Membership 1911, 152.
Herd Books published, Volumes 1 and 2.

Registrations, Transfers, Etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
*722	236	7	$220 00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	212	118	5	$104 00
Manitoba	363	55	.....	56 00
Saskatchewan	68	21	1	14 00
Alberta	110	30	1	38 00
British Columbia	7	2	.....	2 00
Quebec	9	10	.....	4 00
Prince Edward Island	3	.....	.....	2 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Aberdeen Angus Association.

January 1st to December 31st, 1911.

For registrations and memberships	$1,331 35
Interest	45 90
	$1,337 25

Credits outstanding, $22.75.

RECEIPTS AND EXPENDITURES.

For Conducting Aberdeen Angus Record.

Receipts.

From Record Committee Fund	$ 91 00
Balance owing to Record Committee by Association	188 30
	279 30

Expenditures.

Salaries to December 31st, 1911	$ 271 83
Refunds to December 31st, 1911	4 81
Audit to December 31st, 1911	2 66
	$279 30

* 222 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.
Auditor

CANADIAN GUERNSEY BREEDERS' ASSOCIATION.

Organized 1905. Incorporated November 20th, 1905. Head Office, Cheggogin, N.S.

Officers for 1911.

Honorary President.....Hon. Sydney Fisher, Knowlton, Que.
President.....D. G. MacKay, Heath, Bell, N.S.
Vice-President.....E. J. Johnson, George's River, N.S.
Secretary-Treasurer.....Howard W. Corning, Cheggogin, N.S.

Directors.

T. D. Bates, Mid Stewiacke, N.S. J. F. Roach, Sussex, N.B.
J. F. Roper, Charlottetown, P.E.I. J. J. Gareau, St. Roch l'Achigan, Que.
R. M. Jackson, Jacksonville, C.B.

Membership 1911, 38.

Registrations, Transfers, Etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
99	17	.....	$15 00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	9			$ 1 00
Quebec	19			3 00
New Brunswick	13	1		3 00
Nova Scotia	31	16		7 00
Prince Edward Island	21			
United States	1			
British Columbia	5			1 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Guernsey Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$ 132 75
Interest	4 40
	$137 15

Credits outstanding, $3.65.

RECEIPTS AND EXPENDITURES.

For Conducting Guernsey Record.

Receipts.

From Record Committee Fund	$ 2 51
Balance owing to Record Committee by Association	49 65
	$52 16

Expenditures.

Salaries to December 31st, 1911	$ 8 52
Refunds to December 31st, 1911	1 02
Audit to December 31st, 1911	27
Adjustment of charges, 1911	42 35
	$52 16

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

SESSIONAL PAPER No. 15b

FRENCH CANADIAN CATTLE BREEDERS' ASSOCIATION.

Organized 1895. Incorporated November 20th, 1905. Head Office, Quebec, Que.

Officers for 1991.

President.....Arsene Denis, St. Norbert Sta., Que.
Vice-President.....T. B. Macaulay, Montreal, Que.
Secretary-Treasurer.....Dr. J. A. Couture, Quebec, Que.

Directors.

Hon. N. Garneau, Quebec, Que.
Joseph Coulombe, St. Norbert (Berthier), Que.
Ls. Thouin, Repentigny, Que.
Gedeon Garceau, Pointe du Lac, Que.
Ls. P. Sylvestre, St. Theodore d'Acton, Que.

Membership 1911, 139.
Herd Book published, Volume 1.

Registrations, Transfers, etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec
*325	115	5	$100 00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	15	3	.....	$ 2 00
Quebec	308	110	5	97 00
United States	2	1	.....	1 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the French Canadian Cattle Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$439 70
Books sold	1 00
Interest	7 90
	$448 60

Credits outstanding, $6.00.

RECEIPTS AND EXPENDITURES.

For Conducting French Canadian Cattle Record.

Receipts.

From Record Committee Fund	$ 14 96
Balance owing to Record Committee by Association	110 28
	$125 24

Expenditures.

Salaries to December 31st, 1911	$123 34
Refunds to December 31st, 1911	1 02
Audit to December 31st, 1911	0 88
	$125 24

* 47 Registrations were Ancestors.

(Sgd). JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

CANADIAN RED POLLED ASSOCIATION.

Organized 1905. Incorporated May 5th, 1906. Head Office, Winnipeg, Man.

OFFICERS FOR 1911.

President.....W. J. McComb, Beresford, Man.
Vice-President.....H. V. Clendenning, Harding, Man.
Secretary-Treasurer.....Dr. A. W. Bell, Winnipeg, Man.

Directors.

H. E. Waby, Enderby, B.C.
Geo. Swales, Myrtle, Man.
John H. Elliott, Irma, Alta.
J. M. Maynard, Chilliwack, B.C.
R. F. Harman, North Battleford, Sask.

Membership 1911, 18.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
*145	22	.....	$18 00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup and New Certificates.	Membership Rec.
Ontario	6	.....	.....	
Manitoba	20	10	.....	$8 00
Saskatchewan	2	.....	.....	
Alberta	10	7	.....	2 00
British Columbia	107	5	.....	8 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Red Polled Association.

January 1st to December 31st, 1911.

For registrations and memberships	$123 50
Interest	6 30
	$129 80

Credits outstanding, $1.75.

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING RED POLLED RECORD.

Receipts.

From Record Committee Fund	$14 94
Balance owing to Record Committee by Association	27 66
	$42 60

Expenditures.

Salaries to December 31st, 1911	$42 35
Audit to December 31st, 1911	0 25
	$42 60

*91 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F C. A.
Auditor.

SESSIONAL PAPER No. 15b

CLYDESDALE HORSE ASSOCIATION OF CANADA.

Organized 1886. Incorporated, Ontario Agriculture and Arts Act, 1886.
Incorporated at Ottawa, 1905. Head Office, Toronto, Ont.

OFFICERS FOR 1911.

President.....John Bright, Myrtle Station, Ont.
Vice-President..... Robert Graham, Bedford Park, Ont.
Secretary-Treasurer..J. W. Sangster, 12 Wellington St. E., Toronto, Ont.

Directors.

John A. Boag, Queensville, Ont. Wm. Smith, Columbus, Ont.
William Graham, Claremont, Ont. James Henderson, Belton, Ont.
James Torrance, Markham, Ont. T. H. Hassard, Markham, Ont.
A. G. Gormley, Unionville, Ont.

Membership, 1911, 1,750.
Stud Books published. Volumes 1 to 20 inclusive.
Index to Stallions, 18 Volumes.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
*3864	2400	184	$3,062 00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	2,294	1,007	78	$ 2,060 00
Manitoba	512	408	28	434 00
Saskatchewan	381	527	34	244 00
Alberta	347	243	25	148 00
British Columbia	65	56	4	34 00
Quebec	190	132	7	82 00
New Brunswick	31	5	5	14 00
Nova Scotia	13	11	1	24 00
Prince Edward Island	8	6	.....	14 00
United States	9	5	2	4 00
Scotland	14	.....	.....	4 00

Cash received at the National Record Office and deposited in the Imperial Bank to the Credit of the Clysdesdale Horse Association of Canada.

January 1st to December 31st, 1911.

For registrations and memberships	$ 13,281 35
For Stud Books	30 00
Interest	437 05
Credits outstanding, $538.78.	$ 13,748 40

RECEIPTS AND EXPENDITURES.

For Conducting Clydesdale Record.

Receipts.

Received from Association to pay Salaries, 1911	$ 2,420 00
Received from Association to pay Refunds, 1911	440 00
From Record Committee Funds	220 26
	$ 3,080 26

Expenditures.

Salaries to December 31st, 1911	$ 2,569 06
Refunds to December 31st, 1911	329 83
Audit to December 31st, 1911	26 28
Insurance	8 81
Balance owing to Association by Record Committee	146 28
	$ 3,080 26

* 184 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

SESSIONAL PAPER No. 15b

CANADIAN SHIRE HORSE ASSOCIATION.

Organized 1888. Incorporated, Ontario Agriculture and Arts Act, 1889.

Incorporated at Ottawa, Ont., 1905. Head Office, Toronto, Ont.

Officers for 1911.

President.....John Breckon, Appleby, Ont.
Vice-President.....Andrew A. Miller, Middlemarch, Ont.
Secretary-Treasurer. ..G. de W. Green, 58 Grenville St., Toronto, Ont.

Directors.

C. E. Porter, Appleby, Ont.
John Gardhouse, Highfield, Ont.
J. M. Gardhouse, Weston, Ont.
James Henderson, Belton, Ont.
William Laking, Haliburton, Ont.
James Dalgety, Glencoe, Ont.
Darius York, Belhaven, Ont.

Membership 1911, 105.
Stud Books published, Volumes 1 and 2.

Registrations, Transfers, Etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
*190	71	3	$138 00

DISTRIBUTION BY PROVINCES.

	Registration.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	89	17	1	$ 96 00
Manitoba	20	9	1	18 00
Saskatchewan	18	12	1	10 00
Alberta	63	33	.....	12 00
British Columbia	.....	.....	.....	2 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Shire Horse Association.

January 1st to December 31st, 1911.

For registrations and memberships	$ 468 92
Interest	20 00
	$ 488 92

Credits outstanding, $5.55.

RECEIPTS AND EXPENDITURES.

For Conducting Shire Record.

Receipts.

From Record Committee Funds	$ 89 53
Balance owing to Record Committee by Association	100 49
	$ 190 02

Expenditures.

Salaries to December 31st, 1911	$ 163 39
Refunds to December 31st, 1911	24 22
Audit to December 31st, 1911	94
Insurance	1 47
	$ 190 02

* 18 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor

CANADIAN HACKNEY HORSE SOCIETY.

Organized February 2nd 1892. Incorporated, Ontario Agriculture and Arts Act. Incorporated at Ottawa, Ont., 1905. Head Office, Toronto, Ont.

OFFICERS FOR 1911.

President ..... W. H. Gibson, Beaconsfield, Que.
Vice-President ..... J. Wesley Allison, Morrisburg, Ont.

DIRECTORS

John A. Boag, Queensville, Ont. — A. Yager, Simcoe, Ont.
E. Watson, Hudson Heights, Que. — T. A. Cox, Brantford, Ont.
T. A. Graham, Claremont, Ont. — T. D. Elliott, Bolton, Ont.
E. C. H. Tisdale, Beaverton, Ont.

Membership, 1911, 146.
Studs books published, Volumes 1 and 2.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
*138	67	6	$153.00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	48	24	3	$72 00
Manitoba	6	7	.....	6 00
Saskatchewan	15	9	1	21 00
Alberta	25	11	1	15 00
British Columbia	15	7	1	12 00
Quebec	14	9	.....	12 00
New Brunswick	1			
Nova Scotia	3	.....	.....	3 00
United States	11	.....	.....	12 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Hackney Horse Society.

January 1st to December 31st, 1911.

For registrations and memberships	$662 70
For Stud Books	13 00
Interest	18 15
	$693 85

Credits outstanding, $12.

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING HACKNEY RECORD.

Receipts.

From Record Committee Funds	$70 81
Balance owing to Record Committee by Society	76 27
	$147 08

Expenditures.

Salaries to December 31st, 1911	$128 23
Refunds to December 31st, 1911	16 03
Audit to December 31st, 1911	1 35
Insurance	1 47
	$147 08

*5 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT.
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.
Auditor.

SESSIONAL PAPER No. 15b

FRENCH CANADIAN HORSE BREEDERS' ASSOCIATION.

Organized 1895. Incorporated November 20th. 1905. Head Office, Quebec, Que.

Officers for 1911.

President.....Joseph Deland, L'Acadie, Que.
Vice-President.....Robert Ness, Howick, Que.
Secretary-Treasurer.....Dr. J. A. Couture, 49 Garden St., Quebec, Que.

Directors.

Ls. Lavallee, St. Guillaume, Que.
Dr. J. H. Vigneau, Trois-Rivieres, Que.
W. P. Kearney, Montreal, Que.
Arsène Denis, St. Norbert Sta., Que.
Ls. P. Sylvestre, St. Theodore d'Acton, Que.
Gédéon Garceau, Point du Lac, Que.
Horance Morin, St. Hyacinthe, Que.
James Bryson, Brysonville, Que.

Membership, 1911, 127.

Registrations, Transfers, etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
61	16	3	$68.00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario		2		
Manitoba	4	1		$ 1 00
Quebec	57	13	3	65 00
United States				2 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the French Canadian Horse Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$ 157 65
Interest	13 55
	$171 20

Credits outstanding, $2.00.

RECEIPTS AND EXPENDITURES.

For Conducting French Canadian Horse Record.

Receipts.

From Record Committee Funds	$ 4 09
Balance owing to Record Committee by Association	33 37
	$37 46

Expenditures.

Salaries to December 31st, 1911	$33 68
Refunds to December 31st, 1911	3 56
Audit to December 31st, 1911	22
	37 46

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

CANADIAN PERCHERON HORSE BREEDERS' ASSOCIATION.

Organized August 1st, 1907. Incorporated December 3rd, 1907. Head Office, Calgary, Alta.

OFFICERS FOR 1911.

President.....W. B. Thorne, Aldersyde, Alta.
Vice-President.....R. C. Upper, North Portal, Sask.
Secretary-Treasurer.....F. R. Pike, High River, Alta.

DIRECTORS.

J. C. Drewry, Cowley, Alta.
George Lane, Calgary, Alta.
E. J. Wigle, Kingsville, Ont.
A. Colquhoun, Brandon, Man.
R. P. Stanley, Moosomin, Sask.

Membership 1911, 175.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
*1393	229	18	$248 00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	223	19	2	$72 00
Manitoba	305	47	2	32 00
Saskatchewan	457	85	2	42 00
Alberta	249	69	9	80 00
British Columbia	2	4		2 00
Quebec	26	4	3	10 00
New Brunswick	8			
Nova Scotia	4	1		
United States	119			10 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Percheron Horse Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$ 2,919 50
Interest	125 65
	$ 3,045 15

Credits outstandings, $74.75

RECEIPTS AND EXPENDITURES.

FOR CONDUCTING CANADIAN PERCHERON RECORD.

Receipts.

From Record Committee Funds	$ 475 66
Balance owing to Record Committee by Association	518 28
	$ 993 94

Expenditures.

Salaries to December 31st, 1911	$ 863 63
Refunds to December 31st, 1921	124 47
Audit to December 31st, 1911	5 84
	$ 993 94

*645 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.
Auditor.

SESSIONAL PAPER No. 15b

CANADIAN BELGIAN DRAFT HORSE BREEDERS' ASSOCIATION.

Organized 1907. Incorporated October 3rd, 1907. Head Office, Quebec, Que.

Officers for 1911.

President.....Paul Tourigny, M.P.P., Victoriaville, Que.
Vice-President.....Charles Eugene Dubord, Mastai, Que.
Secretary-Treasurer.....J. A. Paquette, Dept. Agriculture, Quebec, Que.

Directors.

Dr. Wilfrid Grignon, Ste. Adéle, Terrebonne, Que.
Joseph Girard, M.P., St. Gédéon, Lac St. Jean, Que.
Georges Tanguay, M.P.P., Quebec, Que.
Victor Chateauvert, Quebec, Que.
Henri Gauvin, Quebec, Que.

Membership 1911, 37.

Registrations, Transfers, etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
*132	49	5	$26 00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	5	2		
Manitoba	15	1	2	$ 2 00
Saskatchewan	67	33	3	12 00
Alberta	26	8		8 00
Quebec	19	5		2 00
United States				2 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Belgian Draft Horse Breeders' Association.

January 1st to December 31st, 1911.

For registrations and memberships	$ 367 60
Interest	2 90
Credits outstanding, 50c.	$ 370 50

RECEIPTS AND EXPENDITURES.

For Conducting Belgian Draft Record.

Receipts.

From Record Committee Funds	$ 5 49
Balance owing to Record Committee by Association	56 55
	$ 62 04

Expenditures.

Salaries to December 31, 1911	$ 45 29
Refunds to December 31, 1911	16 01
Audit to December 31, 1911	0 74
	$ 62 04

*9 Registrations were Ancestors.

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

CANADIAN STANDARD BRED HORSE SOCIETY.

Organized February, 1909. Incorporated 1910. Head Office, Ottawa, Ont.

Officers and Directors, 1911.

Hon. President.....Robert Davies, Toronto, Ont.
President.....O. B. Sheppard, Toronto, Ont.
Vice-President.....J. Wesley Allison, Morrisburg, Ont.
Secretary-Treasurer.....John W. Brant, Ottawa, Ont.

Directors.

W. J. Cowan, Cannington, Ont.
Duncan Brown, Iona, Ont.
Howard Ashley, Foxboro, Ont.
J. M. Baldwin, Killarney, Man.
E. J. Rochon, Winnipeg, Man.
J. A. Childs, Eglinton, Ont.
J. M. Gardhouse, Weston, Ont.
W. P. Kearney, Montreal, Que.
W. R. Crossen, Cobourg, Ont.
W. E. Baker, V.S., Hamilton, Ont.
George Peper, Toronto, Ont.

Registrations, Transfers, Etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
302	4	2	$162.00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	107	3	2	$64 00
Manitoba	22	1		16 00
Alberta	33			8 00
Saskatchewan	51			10 00
British Columbia	39			50 00
Quebec	28			10 00
New Brunswick	4			
Nova Scotia	14			
United States	4			4 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Standard Bred Horse Society.

January 1st to December 31st, 1911.

For registrations and memberships	$1,028 25
Interest	15 35
	$1,045 60

RECEIPTS AND EXPENDITURES.

For Conducting Standard Bred Record.

Receipts.

From Record Committee Funds	$181 08
Balance owing to Record Committee by Society	59 25
	$240 33

Expenditures.

Salaries to December 31st, 1911	$179 02
Audit to December 31st, 1911	2 06
Refunds to December 31st, 1911	59 25
	$240 33

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

SESSIONAL PAPER No. 15b

CANADIAN THOROUGHBRED HORSE SOCIETY.

Organized 1906. Incorporated May 30th, 1906. Head Office, Toronto, Ont.

Officers for 1911.

President.....William Hendrie, Hamilton, Ont.
Vice-President.....Robert Davies, Todmorden, Ont.
Second Vice-President and Secretary-Treasurer.....J. J. Dixon, Toronto, Ont.

Directors.

A. E. Dyment, Toronto, Ont.
R. W. Davies, Toronto, Ont.
A. E. Ogilvie, Montreal, Que.
Raymond F. Dale, Qu'Appelle, Sask.
W. J. Taylor, Victoria, B.C.

Membership 1911, 63.

Registrations, Transfers, Etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
276	22	6	$84.00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	114	12		$56 00
Manitoba	3	2		4 00
Saskatchewan	11			2 00
Alberta	64	3	5	10 00
British Columbia	45	2		2 00
Quebec	36	1	1	10 00
New Brunswick	3			

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Thoroughbred Horse Society.

January 1st to December 31st, 1911

For registrations and memberships	$490 25
Interest	30 35
	$520 60

Credits outstanding, $1.00.

RECEIPTS AND EXPENDITURES.

For Conducting Thoroughbred Record.

Receipts.

From Record Committee Funds	$ 93 27
Balance owing to Record Committee by Society	120 91
	$214 18

Expenditures.

Salaries to December 31st, 1911	$169 32
Refunds to December 31st, 1911	43 88
Audit to December 31st, 1911	0 98
	$214 18

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

CANADIAN PONY SOCIETY.

Organized 1901. Incorporated March 25th, 1908. Head Office, Toronto, Ont.

Officers for 1911.

Hon. President.....Charles E. Stone, Toronto, Ont.
President.....A. E. Major, Whitevale, Ont.
1st Vice-President.....T. A. Cox, Brantford, Ont.
2nd Vice-President.....C. J. Lovejoy, Mimico, Ont.
Secretary-Treasurer.....W. J. Stark, 12 Wellington St. E., Toronto, Ont.

Directors.

Robert Graham, Bedford Park, Ont. E. C. H. Tisdale, Beaverton, Ont.
W. J. Langton, Toronto, Ont. Theo. A. McGillivray, Whitby, Ont.
W. I. Elder, Brandon, Man. Arthur Milne, Green River, Ont.
H. M. Robinson, Toronto, Ont. W. H. Knowlton, Toronto, Ont.
W. J. Stark, Toronto, Ont. J. M. Gardhouse, Weston, Ont.

Membership 1911, 108.

Registrations, Transfers, etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
88	8	.....	$56 00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	37	4	.....	$44 00
Manitoba	17	.....	.....	6 00
Saskatchewan	6	1	.....	4 00
Alberta	22	.....	.....	2 00
British Columbia	5	.....	.....	
Quebec	1	3	.....	

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Pony Society.

January 1st to December 31st, 1911.

For registrations and memberships	$ 194 70
Interest	2 65
	$197 35

RECEIPTS AND EXPENDITURES.

For Conducting Pony Record.

Receipts.

From Record Committee Funds	$ 30 73
Balance owing to Record Committee by Society	34 05
	$64 78

Expenditures.

Salaries to December 31st, 1911	$ 55 79
Refunds to December 31st, 1911	8 60
Audit to December 31st, 1911	39
	$64 78

(Sgd.) JNO. W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.
Auditor.

SESSIONAL PAPER No. 15b

CANADIAN SUFFOLK HORSE SOCIETY.

Organized 1910. Incorporated April 27th, 1910. Head Office, Lamerton, Alta.

Officers for 1911.

President.....Raymond Knight, Raymond, Alta.
Vice-President.....Patrick Burns, Calgary, Alta.
Secretary-Treasurer.....Archie Jaques, Lamerton, Alta.

Directors.

Mossom Boyd, Bobcaygeon, Ont.
M. Loggan, Calgary, Alta.
J. Barker, Calgary, Alta.
J. A. W. Fraser, Jumping Pond, Alta.
F. J. Hartell, Cheadle, Alta.
John Lyons, Cheadle, Alta.
Norman Jaques, Lamerton, Alta.

Membership 1911, 17.

Registrations, Transfers, etc., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
100	5	.....	$18 00

DISTRIBUTION BY PROVINCES.

	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	36	1	.....	$ 2 00
Manitoba	1	.....	.....	
Saskatchewan	21	.....	.....	6 00
Alberta	42	4	.....	10 00

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian Suffolk Horse Society.

January 1st to December 31st, 1911.

For registrations and memberships	$ 232 35
Interest	5 00
Credits outstanding, $3.00.	$237 35

RECEIPTS AND EXPENDITURES.

For Conducting Suffolk Record.

Receipts.

From Record Committee Funds	$ 56 26
Balance owing to Record Committee by Society	2 39
	$58 65

Expenditures.

Salaries to December 31st, 1911	$ 55 79
Audit to December 31st, 1911	47
Refunds to December 31st, 1911	2 39
	$58 65

(Sgd.) JNO W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH F.C.A
Auditor.

CANADIAN FRENCH COACH HORSE BREEDERS' ASSOCIATION.

Organized 1910. Incorporated April 27th, 1910. Head Office, Calgary, Alta.

OFFICERS FOR 1911.

President..... G. E. Goddard, Cochrane, Alta.
Vice-President..... C. R. de la Vergne, Glenbow, Alta.
Secretary-Treasurer..... E. L. Richardson, Calgary, Alta.

Directors.

W. B. Thorne, Aldersyde, Alta. J. M. Bratton, Springpoint, Alta.
John A. Turner, Calgary, Alta. George Hoadley, Okotoks, Alta.
D. P. McDonald, Cochrane, Alta.

Membership 1911, 4.

REGISTRATIONS, TRANSFERS, ETC., 1911.

Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec..
13	....	.....	$2 00

DISTRIBUTION BY PROVINCES.

—	Registrations.	Transfers.	Dup. and New Certificates.	Membership Rec.
Ontario	2	.....	.....	$2 00
Saskatchewan	3	.....	.....	
Alberta	7	.....	.....	
British Columbia	1	.....	.....	

Cash received at the National Record Office and deposited in the Imperial Bank to the credit of the Canadian French Coach Horse Association.

January 1st to December 31st, 1911.

For registrations and memberships	$45 00
Interest	1 70
	$46 70

RECEIPTS AND EXPENDITURES

FOR CONDUCTING CANADIAN FRENCH HORSE RECORDS.

Receipts.

From Record Committee Funds	$6 81

Expenditures.

Salaries to December 31st, 1911	$6 72
Audit to December 31st, 1911	09
	$6 81

(Sgd.) JOHN W. BRANT,
Accountant.

(Sgd.) GEO. L. BLATCH, F.C.A.,
Auditor.

SESSIONAL PAPER No. 15b

DISTRIBUTION OF SALARIES 1911.

Association.	Cost of Accountants' Department.	Cost of Registrars' Department.	Charged to each Association.	Charged to Government Grant.	Paid out of Record Com. Account.	Total paid on Acct. of each Association.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Swine	655 50	996 35	1,228 04	423 81	.....	1,651 85
Sheep	298 29	481 15	586 71	192 73	.....	779 44
Shorthorn	918 24	2,658 50	2,925 10	651 64	.....	3,576 74
Ayrshire	467 15	629 77	728 87	368 05	.....	1,096 92
Hereford	188 41	254 40	294 27	148 54	.....	442 81
Jersey	123 22	166 15	192 05	97 32	.....	289 37
Galloway	5 56	7 20	8 33	4 43	.....	12 76
Aberdeen Angus	115 56	156 27	180 74	91 09	.....	271 83
Guernsey	3 30	5 22	6 01	2 51	.....	8 52
Canadian Cattle	42 04	81 30	108 38	14 96	.....	123 34
Red Polled	18 86	23 49	27 41	14 94	.....	42 35
Clydesdale	619 06	1,950 00	2,348 80	220 26	.....	2,569 06
Shire	25 82	137 57	73 86	89 53	.....	163 39
Hackney	20 32	107 91	57 42	70 81	.....	128 23
Canadian Horse	11 48	22 20	29 59	4 09	.....	33 68
Percheron	136 90	726 73	387 97	475 66	.....	863 63
Belgian Draft	15 44	29 85	39 80	5 49	.....	45 29
Standard Bred	28 38	150 64	.....	179 02	.....	179 02
Thoroughbred	26 84	142 48	76 05	93 27	.....	169 32
Pony	8 84	46 95	25 06	30 73	.....	55 79
Suffolk	8 84	46 95	.....	55 79	.....	55 79
French Coach	95	5 77	.....	6 72	.....	6 72
Translator	1,491 65	.....	.....	1,491 65	.....	1,491 65
Temporary assistance	119 05	.....	.....	.....	119 05	119 05
Proof Reader and other assistance	1,088 33	.....	.....	.....	1,088 33	1,088 33
	6,438 03	8,826 85	9,324 46	4,733 04	1,207 38	15,264 88

COMPARATIVE STATEMENT for the years 1907, 1908, 1909, 1910, 1911, showing Pedigrees and Transfers recorded and amount of fees received.

Association.	Pedigrees Recorded.					Transfers Recorded.					Money Received.				
	1907.	1908.	1909.	1910.	1911.	1907.	1908.	1909.	1910.	1911.	1907.	1908.	1909.	1910.	1911.
											$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Shorthorn	10,253	7,038	7,487	7,544	7,430	2,804	2,272	2,827	3,044	2,639	14,508 40	10,832 10	12,214 42	11,974 40	11,731 73
Ayrshire	2,144	1,653	2,373	2,395	2,833	914	694	985	1,079	1,254	2,797 90	2,695 93	3,496 38	4,126 37	4,776 30
Hereford	683	901	1,214	819	1,295	141	277	265	345	340	828 45	933 35	1,300 15	1,089 45	1,672 52
Swine	6,277	4,435	3,735	8,205	7,136	594	459	407	537	732	4,562 93	3,422 00	3,121 60	5,716 65	5,330 45
*Clydesdale	6,117	2,665	5,169	5,702	3,864	511	560	1,812	2,078	2,400	7,296 40	4,575 19	11,253 27	13,128 10	13,311 35
Hackney	132	112	182	167	138	55	15	71	67	67	395 40	342 85	686 25	644 16	675 70
Shire	100	124	284	126	190	8	9	40	55	71	165 00	194 50	573 55	396 45	468 92
Thoroughbred	6	139	273	243	276	.....	.....	7	22	22	24 00	262 40	583 10	503 25	490 25
Sheep	3,628	2,060	2,572	2,105	2,856	240	190	570	309	664	1,234 95	1,314 84	1,682 95	1,616 65	2,161 65
Aberdeen Angus	1,106	820	670	917	772	84	94	152	222	236	341 60	563 35	625 40	1,561 90	1,331 35
Galloway	103	96	41	71	38	4	15	11	40	6	56 25	119 15	51 55	79 10	39 00
Jersey	326	223	340	543	715	27	92	107	141	336	334 85	304 80	505 90	755 60	1,130 93
Red Polled	36	172	320	196	145	2	5	4	20	22	28 00	40 50	56 50	107 00	123 50
Guernsey	38	73	76	87	99	4	5	19	30	17	47 50	68 25	90 00	106 90	132 75
Canadian Cattle	576	324	254	257	325	42	51	72	86	115	135 50	174 75	275 10	312 15	440 70
Canadian Horses	474	246	85	118	61	3	8	23	16	16	228 50	237 60	530 26	318 80	157 65
Pony	.....	49	37	102	88	.....	.....	5	2	8	.....	64 20	73 00	185 85	194 70
Belgian	.....	16	58	163	132	.....	.....	1	22	49	.....	80 00	210 00	492 90	367 60
Percheron	.....	1,244	993	969	1,393	.....	6	9	87	229	.....	1,176 85	1,529 25	2,082 05	2,919 50
Suffolk	.....	.....	.....	22	100	.....	.....	.....	.....	5	.....	.....	.....	96 85	232 35
French Coach	.....	.....	.....	12	13	.....	.....	.....	.....	.....	.....	.....	.....	32 00	45 00
Standard Bred	.....	.....	.....	42	302	.....	.....	.....	.....	4	.....	.....	.....	196 50	1,028 25
Total	31,999	22,390	26,163	30,805	30,201	5,433	4,752	7,387	8,202	9,232	32,985 63	27,439 61	40,078 73	47,277 62	48,756 15

* All Scottish ancestry recorded in former years, discontinued commencing with 1911.

IMPORTATIONS, 1911.

Animals for the improvement of stock were imported as follows during 1911:—

Clydesdale Horses	1,367	Suffolk Horses	58
Percheron Horses	540	Swine	52
Standard Bred Horses	234	Hereford Cattle	51
Ayrshire	160	Red Polled Cattle	47
Belgian Horses	114	Hackney Horses	33
Thoroughbred Horses	113	Shorthorn Cattle	25
Sheep	86	American Saddle Horses	9
Shire Horses	85	Guernsey Cattle	6
Ponies	80	French Coach Horses	5
Aberdeen Angus Cattle	79	Morgan Horses	5
Jersey Cattle	71	German Coach Horses	4
		Hunter Horses	4
		Total	3,219

EXPORTATIONS TO THE UNITED STATES.

From January 1st to December 31st, 1911.

The Bureau of Animal Industry at Washington issued certificates of pure breeding for animals exported from Canada as follows:—

For Horses—Shire, 1; Standard Bred, 1; Belgian, 2; Hackney, 4; Clydesdale, 29; For Cattle—Shorthorn, 47; Ayrshire(186; For Sheep—Oxford Down, 90. For Swine —Hampshire, 1; Poland China, 1; Yorkshire, 2; Tamworth, 32.

HERD, STUD AND FLOCK BOOKS ISSUED IN 1911, OR NOW IN THE PRESS.

	Volume.
Dominion Shorthorn Herd Book	28
Canadian Ayrshire Herd Book	20 & 21
Dominion Swine Breeders' Record	22
Clydesdale Stud Book of Canada	19 & 20
Clydesdale Index	1 to 18 inc.
Canadian National Record for Sheep	2
Canadian Hereford Herd Book	6
Canadian Aberdeen Angus Herd Book	2
Canadian Percheron Stud Book	1

TRANSPORTATION OF PURE BRED ANIMALS.

All animals recorded in the Canadian National Records are entitled to reduced freight rates over the Grand Trunk, Grand Trunk Pacific, Canadian Pacific, Intercolonial and Canadian Northern railways when shipped for breeding purposes. These rates do not apply when animals are shipped to exhibitions or for the purpose of contesting in races. Canadian freight classification as to weights govern.

There is no reduction when animals are shipped by express.

In the case of imported animals of a breed for which there is no Canadian record, but which are recorded in a recognized foreign record, (see page 39), an arrangement has been made for transportation at reduced rates from the point of entry into Canada to destination on presentation of a transportation certificate to the railway agent. This certificate is issued by the National Record Office in connection with import certificate, and is taken up by the railway agent.

MEMBERS, 1911.

Dominion Shorthorn Breeders' Association	2,056
Clydesdale Horse Association of Canada	1,750
Canadian Ayrshire Breeders' Association	781
Dominion Swine Breeders' Association	573
Dominion Sheep Breeders' Association	315
Canadian Hereford Breeders' Association	237
Canadian Percheron Horse Breeders' Association	175
Canadian Jersey Cattle Club	174
Canadian Aberdeen-Angus Association	152
Canadian Hackney Horse Society	146
French Canadian Cattle Breeders' Association	139
French Canadian Horse Breeders' Association	127
Canadian Pony Society	108
Canadian Shire Horse Association	105
Canadian Standard Bred Horse Society	66
Canadian Thoroughbred Horse Society	63
Canadian Guernsey Breeders' Association	38
Canadian Belgian Draft Horse Breeders' Association	37
Canadian Red Polled Association	18
Canadian Suffolk Horse Society	17
North American Galloway Association	16
Canadian French Coach Horse Breeders' Association	4

The annual membership fee to each association is $2 with the following exceptions: Canadian Hackney Horse Society, $3; Dominion Sheep Breeders' Association, Canadian Jersey Cattle Club, North American Galloway Association, Canadian Guernsey Breeders' Association, French Canadian Cattle Breeders' Association and the French Canadian Horse Breeders' Association, $1.

CANADIAN CUSTOMS REGULATIONS BY WHICH ANIMALS FOR THE IMPROVEMENT OF STOCK ARE ADMITTED FREE OF DUTY.

CUSTOMS MEMO. 1522-B.

CONSOLIDATED AND AMENDED REGULATIONS RESPECTING FREE ENTRY OF ANIMALS FOR THE IMPROVEMENT OF STOCK, IN EFFECT MARCH 1, 1909.

Memo. No. 1480-B and Memo. No. 1482-B are hereby cancelled and the following regulations are submitted therefor, in effect March 1, 1909:—

Under Order in Council of May 21, 1908, His Excellency the Governor in Council is pleased to order that on and after the 1st day of July, 1908, the regulations established by Order in Council of November 8, 1887, respecting 'animals for the improvement of stock,' shall be and the same are hereby revoked, and the following regulations prescribed in respect of the free entry under the Customs Tariff of horses, cattle, sheep, goats, asses and swine, for the improvement of stock:—

Regulations.

1. No animal imported for the improvement of stock shall be admitted free of duty unless the importer is domiciled in Canada or is a British subject, and furnishes a certificate of the record and pedigree in a list of registers designated from time to time by the Minister of Customs, showing that the animal is pure bred and has been admitted to full registry in a book of record established for that breed.

An affidavit by the owner, agent or importer that such animal is the identical animal described in said certificate of record and pedigree must be presented.

2. In case such certificate is not at hand at the time of the arrival of the animals, the entry for duty may be accepted subject to the refund of the duty upon production of the requisite certificates and proofs in due form satisfactory to the collector, within one year from the time of entry.

3. The form of certificate of record and pedigree to be accepted for the free importation of animals for the improvement of stock, and the Customs procedure in connection therewith shall be subject to the directions of the Minister of Customs.

Instructions.

(*a*) The following is a list of registers designated by the Minister of Customs, in one of which animals must be registered as pure bred, prior to admission free of duty for the improvement of stock, viz.:—

For Holstein-Friesian Cattle.

THE HOLSTEIN-FRIESIAN ASSOCIATION OF CANADA, ST. GEORGE, ONT

For Horses, Cattle, Sheep, Goats. Asses and Swine (but not including Holstein-Friesian Cattle.)

CANADIAN NATIONAL RECORDS, OTTAWA, CANADA.

Also any register certified by the accountant of the Canadian National Records as a recognized book of record in the country of the origin of the breed.

(*b*) An import form of certificate, to be delivered to the Collector of Customs before free entry of animals for improvement of stock is allowed, shall be in one of the forms following, viz.:—

For Live Stock other than Holstein-Friesian cattle.

IMPORT CERTIFICATE.

CANADIAN NATIONAL RECORDS.

FORM 2.

I hereby certify that the animal (name)..... (number).....is pure bred and is registered in the (state book of record)..... .....the Canadian book of Record for (state breed).....

(Signature).....

Accountant, Canadian National Records.

OTTAWA, CANADA,..... .....19....

IMPORT CERTIFICATE.

CANADIAN NATIONAL RECORDS.

FORM 2-A.

I hereby certify that the animal (name)..... (number)..... .....is registered in the (state book of record) .....the recognized book of record in the country of the origin of the breed of (state breed) ....

(Signature).....

Accountant, Canadian National Records.

OTTAWA, CANADA,..... .....19....

For Holstein-Friesian Cattle:—

IMPORT CERTIFICATE.

HOLSTEIN-FRIESIAN ASSOCIATION OF CANADA.

FORM 1.

I hereby certify that the animal (name)..... .... (number)..... ....is pure bred and is registered in the Holstein-Friesian Herd Book of Canada, the Canadian Book of Record for Holstein-Friesian Cattle.

(Signature)..... ....

Secretary.
Holstein-Friesian Breeders' Association of Canada.

ST. GEORGE, ONTARIO,..... 19....

(*c*) The Import Certificate shall be attached to the free Customs entry for transmission by the collector to the Department of Customs, Ottawa.

The said certificate shall be marked in each case with the Customs entry number and the office dating stamp.

The Collector of Customs shall not demand or accept any certificate as to pedigree, other than in one of the 'Import Certificate' forms herein prescribed.

(*d*) Animals may be shipped in bond from the Canadian frontier port to the Customs port of destination, subject to quarantine requirements.

(*e*) Import certificates for Holstein-Friesian cattle are issued by the secretary of the Holstein-Friesian Association of Canada, St. George, Ontario.

(*f*) Import certificates for live stock other than Holstein-Friesian cattle, may be procured on application to 'Accountant,' Canadian National Records, Ottawa, from whom there may also be obtained a list of Canadian Records, lists of recognized foreign records, and other information concerning the importation of pure bred animals for the improvement of stock.

(Sgd.) JOHN McDOUGALD,
Commissioner of Customs.

NOTE.—Importers should see that Canadian Certificates of Registration or Foreign Certificates are not handed to the Customs. Read section 3, paragraph 3, above.

Accountant, C.N.L.S.R.

THE REGULATIONS EXPLAINED.

To obtain free Customs entry of an animal of a breed for which there is a Canadian Record (other than Holstein-Friesian Cattle), the importer must forward to the Accountant, Canadian National Records, Ottawa, an application made out on a form supplied by the National Record Office, accompanied by the Foreign Certificates of Registration, and the necessary fees for registration as specified elsewhere in this report, and in addition for Import Certificate, a fee of 50 cents for Horses and Cattle and 10 cents for Swine and Sheep. The Foreign Certificate of Registration must in all cases show the Canadian importers' ownership.

The Import Certificate will be forwarded to pass Customs at the point of entry into Canada or elsewhere as the importer may direct. In no case should the importer present any certificate of registration to the Custom authorities other than the Import Certificate.

Importers should be careful to observe the veterinary requirements in connection with the importation of animals. (See page 50). Further information may be procured from the Veterinary Director General, Ottawa, Canada.

CANADIAN BOOKS OF RECORD.

HORSES.

Name of Breed.	Book of Record	Name of Association.
Clydesdale	Clydesdale Stud Book of Canada	Clydesdale Horse Association of Canada.
Hackney	Canadian Hackney Stud Book	Canadian Hackney Horse Society.
Shire	Canadian Shire Horse Stud Book	Canadian Shire Horse Association.
Percheron	Canadian Percheron Stud Book	Canadian Percheron Horse Breeders' Association.
Thoroughbred	Canadian Thoroughbred Stud Book	Canadian Thoroughbred Horse Society.
Belgian Draft	Canadian Belgian Draft Stud Book	Canadian Belgian Draft Horse Breeders' Association.
French Canadian	French Canadian Horse Breeders'	French Canadian Horse Breeders' Association of Canada.
Shetland, Welsh, New Forest, Polo and Riding, Exmoor and Hackney Ponies	Stud Book	Canadian Pony Society.
	Canadian Pony Stud Book	Canadian French Coach Horse Breeders' Association.
French Coach	Canadian French Coach Stud Book	Canadian Suffolk Horse Society.
Suffolk Horse	Canadian Suffolk Horse Stud Book	Canadian Standard Bred Horse Society.
Standard Bred	Canadian Standard Bred Stud Book.	

CATTLE.

Shorthorn	Dominion Shorthorn Herd Book	Dominion Shorthorn Breeders' Association.
Ayrshire	Canadian Ayrshire Herd Book	Canadian Ayrshire Breeders' Association.
Hereford	Canadian Hereford Herd Book	Canadian Hereford Breeders' Association.
Jersey	Canadian Jersey Cattle Club Record.	Canadian Jersey Cattle Club.
Galloway	North American Galloway Herd Book	North American Galloway Association.
Aberdeen Angus	Canadian Aberdeen Angus Association's Record	Canadian Aberdeen Angus Association.
Guernsey	Canadian Guernsey Herd Book	Canadian Guernsey Breeders' Association.
French Canadian	French Canadian Cattle Breeders' Herd Book.	French Canadian Cattle Breeders' Association of Canada.
Red Polled	Canadian Red Polled Herd Book	Canadian Red Polled Association.
Holstein-Friesian	Holstein-Friesian Herd Book of Canada	Holstein-Friesian Association of Canada.

SWINE.

Name of Breed.	Book of Record.	Name of Association.
Yorkshire, Berkshire, Tamworth, Chester White, Poland China, Duroc Jersey, Hampshire, Essex	Dominion Swine Breeders' Record	Dominion Swine Breeders' Association

SHEEP.

Shropshire, Leicester, Oxford Down, Cotswold, Lincoln, Dorset, Hampshire, Southdown, Suffolk, Cheviot, Blackface	Canadian National Records	Dominion Sheep Breeders' Association

FOREIGN BOOKS OF RECORD.

IMPORT CERTIFICATES FOR ANIMALS OF A BREED FOR WHICH THERE IS NO CANADIAN RECORD.

In order to secure free Customs entry for an animal of a breed for which there is no Canadian Record, but which is recorded in a foreign record recognized as reliable, the importer must forward to the Accountant, Canadian National Records, the foreign certificate of registration accompanied by fees as follows:—For horsers, cattle or asses, $2.00 each, for sheep, swine or goats, 50 cents each. The Import Certificate will be forwarded to pass the Customs at the point of entry into Canada or elsewhere as the importer may direct.

In no case should the importer present any certificate of registration to the Custom authorities other than the Import Certificate.

Importers should be careful to observe the veterinary requirements in connection with the importation of animals. (See page 50). Further information may be procured from the Veterinary Director General, Ottawa, Canada.

RECOGNIZED FOREIGN RFCORDS.

HORSES.

Name of Breed.	Book of Record.	Name of Association.
Cleveland Bay	Cleveland Bay Stud Book	Cleveland Bay Horse Society of Great Britain and Ireland, Nunthrope, R. S. O., England.
Yorkshire Coach	Yorkshire Coach Horse Stud Book	Yorkshire Coach Horse Society of Great Britain and Ireland, Bolton Perdy, R. S. O., England.
Morgan	American Morgan Register	American Morgan Register Association, Middlebury, Vt., U.S.A.
Saddle Horse	American Saddle Horse Register	American Saddle Horse Breeders' Association, Louisville, Ky.
German Coach	Ostfriesisches Stutbuch	Landwirthschaftlichen, Hauptverein fur Ostfriesland, Norden, Germany.
	Stutbuch der Munsterlandisch-Oldenburgischen Geest	Zuchturband des Sudlischen Zuchtgebietes, Oldenburg. Germany.
Oldenburg	Oldenburger Stutbuch	Verband der Zuchter des Oldenburger elegaten schweren Kutschpferdes, Oldenberg, Germany.
Holstein Coach	Gestutbuch der Holsteinchen Marschen	Verband der Pferdezuchter in den Holsteinischen Marschen, Holstein, Germany.
Hunter	Hunter Stud Book	Hunters' Improvement Society, 12 Hanover Square, London, England.

CATTLE.

Highland	Highland Herd book	Highland Cattle Society of Scotland, Inverness, Scotland.
Kerry & Dexter	Kerry & Dexter Herd Book	Kerry & Dexter Herd Book, Dublin, Ireland.
Sussex	Sussex Herd book	Sussex Herdbook Society, London, England.
Devon	Davies Devon Herd Book	Devon Cattle Breeders' Society, Wiveliscombe, England.
Longhorned Cattle	Longhorned Herd Book	Longhorned Cattle Society, Atherstone, England.
Welsh Black Cattle	Welsh Black Cattle Herd Book	Welsh Black Cattle Society, Haverfordwest, Wales.
Polled Durham	American Polled Durham Herd Book.	Polled Durham Breeders' Association, Indianapolis, Ind., U.S.
Polled Hereford	National Polled Hereford Herd Book.	National Polled Hereford Breeders' Association, Chicago, Ill., U.S.A.
Lincolnshire Red Shorthorn	Lincolnshire Red Shorthorn Association Herd Register	Lincolnshire Red Shorthorn Association.

SWINE.

Name of Breed.	Book of Record.	Name of Association.
Large Black Pig	Large Black Pig Society Herd Book.	Large Black Pig Society, Ipswick, England.
Lincolnshire Curly Coated Pig	Curly Coated Pig Breeder's Herd Book	Lincolnshire Curly Coated Pig Breeders' Assocation, Thornhayes, England.

SHEEP.

Kent or Romney Marsh	Kent or Romney Marsh Flock Book..	Kent or Romney Marsh Sheep Breeders' Association, London, W.C., England.
Wensleydale Longwool	Wensleydale Flock Book	Wensleydale Longwool Sheep Breeders' Association, Yorkshire, England.
Wensleydale Bluefaced	Wensleydale Bluefaced Flock Book	Incorporated Wensleydale Bluefaced Sheep Breeders' Association and Flock Book Society, Carperby, England.
Dartmoor	Dartmoor Sheep Breeders' Association Flock Book	Dartmoor Sheep Breeders' Association.

GOATS.

Goats	British Goat Society Herd Book	British Goat Society, Kingston on Thames, England.
Toggenburg	Toggenburg Herd Book	Toggenburg Club, Beefolds, Farnham, England.

ASSES.

Jacks and Jennets	Studbook Mulassier	Société Centrale d'Agriculture des deux Sevres.
Jacks and Jennets	Studbook of Jack & Jennets of Spain.	

APPLICATIONS FOR CANADIAN REGISTRATION AND IMPORT CERTIFICATE.

In the case of cattle, sheep and swine from European countries the importer need not make application for registration and import certificate until the animals arrive at quarantine, as the quarantine period allows ample time to secure certificates before having to pass the Customs.

In the case of horses from European countries the importer should, if possible, forward his foreign certificates, along with application and fees, on a mail boat sailing before the stock is shipped. Import certificates and Canadian certificates of registration can then be sent to meet the horses on landing. The Canadian certificate is necessary in order to get the reduced freight rates. In the case of late purchasers, importers landing horses at Montreal or at St. John, or other Atlantic ports, may mail their applications, foreign certificates and fees on landing and then ship in bond subject to quarantine requirements, to the nearest Custom House to destination. It must in all cases be definitely stated where import certificates are to be forwarded.

In addition to the foreign certificate of registration, an application made out on the regular form, supplied by the National Record Office, is required. The foreign certificate of registration must show the ownership of the Canadian importer. Fees for registration are indicated elsewhere in this report.

For animals imported in dam, certificates of service must be procured from the breeder, signed by the owner of the sire at the time of service.

The National Record Office gives special service in issuing import certificates. Certificates will be mailed to the importer in care of the Customs officer at the port of entry, or to any other address desired.

Canadians wishing to import pure bred animals from the United States, in order to avoid delay and trouble at the port of entry, should secure registration of the animals in the Canadian Record and Import Certificates before the animals are shipped.

In the case of swine from the United States, which the present health regulations require to be quarantined, the registration of animals may, if desired, be deferred until after the animals have arrived at quarantine.

It will be observed from paragraph 1 of the regulations that only British subjects or persons domiciled in Canada are entitled to the privilege of free entry of animals for the improvement of stock. This does not apply to settlers who are accorded certain privileges in regard to the bringing in of settlers' effects.

Blank application forms and other information, if desired, will be furnished on application to the accountant, National Live Stock Records, Ottawa, Canada.

ELIGIBILITY OF ANIMALS FOR CANADIAN RECORDS.

It is important that Canadian importers, before purchasing animals of a breed for which there is a Canadian record, ascertain if they are recorded in the proper foreign record, and if so, if they are eligible for record in Canada. Canadian registration of imported animals will not be made unless proper foreign certificate is presented, and ownership of animals properly authenticated.

Canadian records, with the exception of those for French Canadian cattle and French Canadian horses, which are purely Canadian, are for the most part based on the records of the countries of the origin of the breeds, but as the Canadian standard of registration is higher in some cases than the standard in the country of origin, or that of other countries, animals may or may not be eligible for entry in the Canadian Records. The following will assist in arriving at the eligibility of an animal. The fees for recording animals in the Canadian Records, bred in other countries, are indicated in each case. (These fees do not in all cases apply to the recording of Canadian bred animals). In addition to the registration fee, 50 cents is charged for each import certificate for horses and cattle, and 10 cents for sheep and swine.

HORSES.

Clydesdale.

Animals recorded and numbered in the Clydesdale Stud Book of Great Britain and Ireland are eligible, provided their sires and dams and grand sires and grand dams are also recorded and numbered therein. The breeding of many horses recorded in the Scottish book does not come up to this standard.

Fees to members.—Animals imported from Great Britain, stallions, $3; mares, $2. To non-members, stallions, $4; mares, $3. Annual membership, $2. If animals are not recorded within 30 days of importation, the fee is $25, and $50 to members and non-members respectively.

Hackney.

Stallions full registered and all mares if by full registered sires recorded in the American Hackney Stud Book, and animals bred in Great Britain or Ireland and recorded in the English Hackney Stud Book, as follows:—

(*a*) Stallions with three top crosses of *full registered sires and with two registered dams.

(*b*) Mares with two top crosses of *full registered sires with one registered dam.

(*c*) Mares with one top cross of *full registered sires with a registered dam.

Fees to members, $2; to non-members, $4. An additional fee of $1 is charged for each ancester recorded to complete pedigrees of animals recorded in the American Stud Book. Annual membership, $3.

Shire.

All animals recorded in the English Shire Horse Stud Book or in the American Shire Horse Stud Book, providing their breeding complies with the Canadian standard of registration. Fees to members—animals under three years of age, $1; animals over three years of age, $2. To non-members, animals under three years of age, $2; animals over three years of age, $4. An additional fee of $1 is charged for each ancestor recorded to complete pedigrees of animals recorded in the American Stud Book.

Percheron.

All animals recorded in the Stud Book Percheron de France or in the American Percheron Stud Book, if, on investigation, their pedigrees are found to be correct. Fees to members—stallions, $3; mares, $1; to non-members—stallions, $5; mares, $2. An additional fee of 50 cents is charged for each ancestor recorded to complete pedigrees of animals recorded in the American Percheron Stud Book (Chicago). Annual membership, $2.

No American bred Percheron will be accepted for registration unless certificate of registration issued by the American Percheron Society, Wayne Dinsmore, Union Stock Yards, Chicago, secretary, is presented with the application.

Thorough-bred.

All animals recorded in the General Stud Book (Great Britain), American, French, Belgian, or Australian stud books. Fees to members, $1; to non-members, $2. Annual membership, $2.

Belgian.

All animals recorded in the Stud Book des Chevaux de Traits Belges, or in the American Register of Belgian Draft Horses. Fees to members—stallions, $3; mares, $1; to non-members—stallions, $4; mares, $2. An additional fee of 50 cents is charged for each ancestor recorded to complete pedigrees of animals recorded in the American Stud Book. Annual membership, $2.

Shetland Ponies.

All animals recorded in the Shetland Pony Stud Book, of Scotland, or the Shetland Islands Pony Stud Book, animals recorded in the American Shetland Pony Stud Book. Fees to members, $1; to non-members, $2. Annual membership, $2.

Welsh Ponies.

All animals recorded in the Welsh Pony and Cob Stud Book (Great Britain), or in the American Welsh Pony and Cob Stud Book. Fees same as Shetland Ponies.

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*Full registered sires are those (*a*) that are recorded as such in any of the first sixteen volumes of the English Hackney Stud Book, or (*b*) those recorded since volume 16, providing they were eligible to full registry under the rules in force for entries in volume 16 of the English Hackney Stud Book.

New Forest Ponies.

Animals imported from Great Britain, recognized as pure bred. A certificate to this effect must be furnished, signed by the breeder and certified by the secretary of the association for the improvement of the breed of New Forest ponies (Great Britain). Fees same as Shetland ponies.

Polo and Riding Ponies.

All animals recorded in the Polo Section of the Polo and Riding Pony Stud Book (Great Britain). Fees same as Shetland ponies.

Exmoor Ponies.

Animals imported from Great Britain, bred by reputable breeders. Certificate of breeding signed by breeder must be furnished. Fees same as Shetland ponies.

Hackney Ponies.

Pony stallions or mares recorded in the American Hackney Stud Book. Rules for ponies imported from Great Britain or Ireland, same as for Hackney horses (*see* page 44). Fees to members, $1; to non-members, $2. Annual membership, $2.

French Coach.

All animals recorded in the Stud Book Francais Registre des Chevaux de Demi-Sang, or animals recorded in the French Coach Horse Stud Book of America, or in the American French Coach Horse Register, if upon investigation, pedigrees are found to be correct and proper. Fees to members—stallions, $3; mares, $1; to non-members—stallions, $5; mares, $2. Annual membership, $2.

Suffolk.

All animals recorded in the English Suffolk Stud Book, or in the American Suffolk Horse Stud Book. Fees to members stallions, $3; mares, $2; to non-members, stallions, $4; mares, $3. Annual membership, $2.

Standard Bred.

All animals recorded as Standard in the American Trotting Register (Chicago). Fees to members, $1.50; to non-members, $3. Annual membership, $2.

CATTLE.

Shorthorn.

Animals imported from Great Britain that trace in all their crosses to animals recorded or eligible for record in the Fortieth or preceding volumes of Coates English Herd Book. Animals recorded in the American Shorthorn Herd Book providing they trace in all their crosses to named ancestors imported from Great Britain. The breeding of such animals, however, must be of the standard required by the rules of entry of the Dominion Shorthorn Breeders' Association. Many animals on record in the American Shorthorn Herd Book are not eligible for entry in the Dominion Shorthorn Herd Book. Fees to members—English animals, 75 cents; American animals, 75 cents; to non-members—English animals, $1.25; American animals, $1.25. An additional fee of 50 cents is charged for each ancestor recorded to complete pedi-

grees of animals recorded in the American Herd Book. All crosses back to and including those imported from Great Britain must be recorded. Annual membership, $2.

Ayrshire.

All animals recorded in the Herd Book of the Ayrshire Cattle Herd Book Society of Great Britain and Ireland. All animals recorded in the American Ayrshire Herd Book. Fees to members—animals bred in Great Britain or Ireland, $1; American bred animals, $1; to non-members—animals bred in Great Britain or Ireland, $2; American bred animals, $2. Additional fees as follows are charged for ancestors recorded to complete pedigrees of animals recorded in the American Book. All animals back to and including those imported from Great Britain, must be recorded. For ancestors owned by applicant, $1; for ancestors not owned by applicant, 25 cents. Annual membership, $2.

Hereford.

All animals recorded in the English Hereford Herd Book. All animals recorded in the American Hereford Herd Book. Fees to members—animals imported from Great Britain, 75 cents; animals imported from the United States, 75 cents; to non-members—animals imported from Great Britain, $2; animals imported from the United States, $2. Additional fees as follows are charged for recording ancestors to complete pedigrees of animals recorded in the American Book. All ancestors back to those and including those imported from Great Britain must be recorded. To members resident in Canada, 50 cents each; to members resident in the United States, 75 cents each; to all non-members, $2 each. Annual membership, $2.

Jersey.

All animals recorded in the Island of Jersey Herd Book. Animals recorded in the English Jersey Herd Book, providing they trace in all their crosses to animals recorded in the Island of Jersey Herd Book. Importers of Jerseys from Great Britain or the Island of Jersey must comply with the import regulations of the Canadian Jersey Cattle Club, which will be supplied on application. Fees to members—animals imported from Great Britain or the Island of Jersey, $1; animals bred in the United States and recorded in the American Book, 50 cents; to non-members—animals imported from Great Britain or the Island of Jersey, $1.50; animals bred in the United States and recorded in the American Book, $1. Animals bred in the United States not recorded in the American Book, to members, $1; to non-members, $1.50; if under two years of age; if over two years of age, $1.50 and $2 respectively. Annual membership, $1.

Galloway.

Animals recorded in the Galloway Herd Book of Great Britain or the American Galloway Herd Book. Fees to members—animals under six months of age, 50 cents; animals over six months of age, $1; to non-members, animals under six months of age, $1; animals over six months of age, $1.50. Annual membership, $1.

Aberdeen Angus.

Animals recorded in the Polled Herd Book (Scotland), or in the American Aberdeen Angus Herd Book. Fees to members, $1, for animals under one year of age, $3; for animals over one year of age; to non-members, $2 for animals under one year of age, $5 for animals over one year of age. An additional fee of 50 cents is charged for each ancestor recorded to complete pedigrees of animals recorded in the American Book.

GUERNSEY.

Animals recorded in the Herd Book of the Royal Guernsey Agricultural Society, the General Herd Book of Guernsey, in the Herd Book of the English Guernsey Cattle Club Herd Register, or in the American Guernsey Cattle Club Herd Register. Animals recorded in other than the Island of Guernsey Record, must trace in all their crosses to animals imported from the Island. Fees to members, $1; to non-members, $2. Annual membership, $1.

RED POLLED.

Animals recorded in the Red Polled Herd Book of Great Britain or in the American Red Polled Herd Book. Fees to members, $1; to non-members, $2. Annual membership, $2. An additional fee of 25 cents for each ancestor recorded to complete pedigrees of animals recorded in the American Red Polled Herd Book is charged.

SWINE.

YORKSHIRE.

Animals recorded in the Large White Section of the English National Pig Breeders' Association Herd Book, or in the American Yorkshire Record. Fees to members, 50 cents; to non-members, $1. An additional fee of 50 cents to members, and $1 to non-members, is charged for each ancestor recorded to complete pedigrees of animals recorded in the American Book. All ancestors back to and including those imported from Great Britain must be recorded. Annual membership, $2.

BERKSHIRE.

Animals recorded in the British Berkshire Herd Book or in the American Berkshire Record. Fees same as Yorkshire, including charges for recording ancestors in American Book.

TAMWORTH.

Animals recorded in the Tamworth Section of the English National Pig Breeders' Association Herd Book, or in the American Tamworth Swine Record. Fees same as Yorkshire, including charges for recording ancestors in American Book.

ESSEX.

Animals recorded in the American Essex Record. Fees same as Yorkshire, including charges for recording ancestors in American Book.

POLAND CHINA.

Animals recorded in the following United States Poland China Records:—American, National, Southwestern, or Standard. Fees to members, 50 cents; to non-members, $1. Annual membership, $2.

CHESTER WHITE.

Animals recorded in the O.I.C. Record (United States). Fees same as Poland China.

DUROC JERSEY.

Animals recorded in the American Duroc Jersey Record, or in the National Duroc Jersey Record. Fees same as Poland China.

Hampshire.

Animals recorded in the American Hampshire Record. Fees same as Poland China.

SHEEP.

Shropshire.

Animals recorded in the English Flock Book of Shropshire Sheep, or in the American Shropshire Sheep Record. Fees to members, 50 cents; to non-members, for animals imported from Great Britain, $2; for animals bred in the United States, $1. Annual membership fee to Dominion Sheep Breeders' Association, $1.

Lincoln.

Animals recorded in the Lincoln Longwood Sheep Breeders' Flock Book or in the American National Lincoln Sheep Breeders' Record. Fees to members, 50 cents; to non-members, $1. Annual membership, $1.

Oxford Down.

Animals recorded in the English Oxford Down Flock Book or in the American Oxford Down Record. Fees same as Lincoln.

Cotswold.

Animals recorded in the English Cotswold Flock Book or in the American Cotswold Record. Fees same as Lincoln.

Dorset.

Animals recorded in the English Dorset Horn Flock Book or in the American Continental Dorset Club Record. Fees same as Lincoln.

Southdown.

Animals recorded in the English Southdown Flock Book or in the American Southdown Record. Fees same as Lincoln.

Hampshire Down.

Animals recorded in the English Hampshire Down Flock Book or in the American Hampshire Down Flock Record. Fees same as Lincoln.

Leicester.

Animals recorded in the English Leicester Flock Book, the English Border Leicester Flock Book, or in the American Leicester Record. Fees same as Lincoln.

Highland Blackface.

Animals imported from Great Britain from flocks recognized as pure bred. A certificate to this effect must be furnished certified by the secretary of the Blackface Sheep Breeders' Association. Fees same as Lincoln.

Cheviot.

Animals recorded in the English Cheviot Sheep Flock Book or in the American Cheviot Flock Book. Fees same as Lincoln.

SUFFOLK.

Animals recorded in the English Suffolk Flock Book or in the American Suffolk Sheep Record. Fees same as Lincoln.

CANADIAN QUARANTINE REGULATIONS.

Persons importing live stock from Europe to Canada will find it to their advantage to ship, whenever possible, by vessels arriving at Canadian ports, as animals shipped via United States ports are liable to serious delay at the boundary, unless all necessary requirements have been complied with and full information furnished beforehand, both to this office and to the Health Animals Branch of the Department of Agriculture.

EXTRACTS FROM QUARANTINE REGULATIONS.

Sec. 3.—The following Customs ports are hereby declared to be Animals' Quarantine Stations, and all animals imported into Canada subject to quarantine must be entered through said stations, viz.:—Halifax, N.S.; St. John and McAdam Junction, N.B.; Charlottetown, P.E.I.; Sherbrooke and St. Johns, Que.; Bridgeburg, Windsor, Sarnia, Sault Ste. Marie and Fort Frances, Ont.; Emerson, Gretna and Bannerman, Man.; North Portal, Wood Mountain, Big Muddy and Willow Creek, Sask.; Pendant d'Oreille, Coutts and Twin Lakes, Alta.; Gateway, Kingsgate, Rossland, Nelson, Grand Forks, Midway Myncaster, Osoyoos, Keremeos, Huntingdon, New Westminster, White Rock, Vancouver and Victoria, B.C.; Whitehorse, Y.T. Quebec is also declared to be an Animals' Quarantine Station in so far as importations into Canada by sea are concerned.

Sec. 4.—Animals subject to inspection only, but which are not subject to quarantine, may enter through the aforesaid and at the following ports:—Pictou, North Sydney and Yarmouth, N.S.; St. Stephens, Woodstock, Edmunston, Grand Falls, St. Leonards, Debec Junction, Florenceville and Aroostook Junction, N.B.; Comin's Mills, Lake Megantic, Coaticooke, Beebe Junction, Highwater, Abercorn, St. Armand, Lacolle Junction, Noyan Junction, Athelstan, Dundee and St. Agnes de Dundee, Que.; Cornwall, Prescott, Morrisburg, Brockville, Kingston, Cobourg, Toronto, Niagara Falls, Port Arthur, Rainy River, Ont.; Snowflake, Man.; Marienthal, Sask.; Rykerts, Nanaimo and Bridesville, B.C.

IMPORTATIONS IN GENERAL.

Sec. 6.—The Minister may prohibit or regulate the importation of animals from any country or any district where he has reason to believe that contagious disease of animals exists.

Sec. 7.—(*a*) Persons contemplating the importation of animals, from any part of the world, except the United States and Newfoundland, must first obtain from the Minister a permit therefor. Such permits shall not be available at any port other than the one mentioned therein.

(*b*) Applications for such permits shall be in writing, and shall state the number and kind of animals for which the permit is applied, the country of origin and probable date of shipment, the port of embarkation, the port at which the animals are to be landed and the approximate date of their arrival. The statements contained therein may be required to be verified on oath, the Minister deciding in every case whether a permit will be granted.

(*c*) Animals from countries other than those above mentioned arriving at any port in Canada without such permit shall not be admitted to Canada unless and until ordered by the Minister.

(*d*) Unless otherwise ordered by the minister, the provisions of this section shall not apply to the importation of horses from any of the other countries of Europe.

Sec. 8.—The importation by sea into Canada of animals from all countries, other than the United States, Newfoundland and Mexico, is prohibited except at the ports of Victoria and Vancouver, B.C.; Quebec, Que.; St. John, N.B.; Halifax, N.S.; Charlottetown, P.E.I., and such other ports as may hereafter be indicated by the Minister.

Sec. 9.—Animals imported via United States ports must be accompanied not only by the necessary health certificates from the country of origin, but also by a certificate of quarantine or inspection signed by a veterinary inspector of the United States Bureau of Animal Industry.

Sec. 11.—All importers must certify under oath, before making Customs entry, the place of origin of the animals imported by them.

Sec. 12.—All animals arriving in Canada through any of the above mentioned ports on the Canadian seaboard shall be subject to inspection on arrival by inspectors who may, from time to time, be appointed for that purpose.

Sec. 13.—All inspections of imported animals must be made in day-light.

Sec. 16.—Importers of animals will be required to certify under oath that the health certificates referred to in these regulations apply to the said animals and to no other, and that the district named is the actual one from which these animals came.

Sec. 17.—Any unauthorized interference with animals after inspection, whether by substitution or otherwise, or any evasion, or misrepresentation will be deemed a breach of these regulations, and in addition will render the shipment liable to seizure and detention pending the orders of the Minister as to its disposal.

Sec. 19.—No person shall import or introduce, or attempt to import or introduce, into Canada any animal contrary to these regulations or which is affected with any contagious or infectious disease, and any animal which is imported or introduced, or attempted to be imported or introduced, into Canada contrary to these regulations or which is affected with or suspected of being affected with any contagious or infectious disease, may be forthwith destroyed, refused admission to Canada, or otherwise disposed of as the Veterinary Director General may direct.

HORSES, MULES AND ASSES.

Sec. 23.—Horses, mules and asses imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no glanders, maladie du coït or other serious infectious or contagious disease affecting horses has existed in said district for a period of six months prior to their shipment.

Sec. 24.—Horses, mules and asses imported from countries other than the United States, Newfoundland and Mexico, consigned to Montreal, may be, unless otherwise ordered by the Minister, inspected at that port. Such animals landing at any of the other ports named shall be inspected at such ports.

CATTLE.

Sec. 25.—Cattle imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no contagious pleuro-pneumonia, rinderpest or foot and mouth disease has existed in said district for a period of six months prior to their shipment.

Sec. 26.—(*a*) A quarantine of thirty days shall be enforced upon cattle imported from the United Kingdom, to be counted from the date of arrival at the quarantine station.

(*b*) A quarantine of ninety days shall be enforced upon cattle imported from all other countries except the United States, Newfoundland and Mexico, to be counted from the date of clearance of the vessel carrying the same from the port at which they were embarked.

OTHER RUMINANTS.

Sec. 27.—Sheep and goats imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no foot and mouth disease has existed in said district for a period of six months prior to their shipment.

Sec. 28.—A quarantine of thirty days shall be enforced upon all sheep and goats imported from countries other than the United States, Newfoundland and Mexico, to be counted from the date of clearance of the vessel carrying the same from the port at which they were embarked.

SWINE.

Sec. 29.—Swine imported from countries other than the United States, Newfoundland and Mexico, must be accompanied by the certificate of a qualified veterinarian and of the local authority of the district whence they came, that no hog cholera, swine plague or foot and mouth disease has existed in said district for a period of six months prior to their shipment.

Sec. 30.—A quarantine of thirty days shall be enforced upon all swine imported from countries other than the United States, Newfoundland and Mexico, to be counted from the date of clearance of the vessel carrying the same from the port at which they were embarked.

IMPORTATION OF ANIMALS FROM THE UNITED STATES, NEWFOUNDLAND AND MEXICO.

Sec. 31.—All animals imported into the Dominion of Canada from the United States, Newfoundland and Mexico, must be accompanied by a statutory declaration or affidavit made by the owner or importer, stating clearly the purpose for which said animals are imported, viz.:—Whether for breeding purposes, for milk production, for work, for grazing, feeding or slaughter, or whether they form part of settlers' effects, or whether they are entered for temporary stay, as provided by these regulations.

Sec. 32.—Said declaration or affidavit must be presented to the Collector of Customs at the port of entry, who will decide whether the animals are entitled to entry under these regulations, and who will notify the veterinary inspector of the Department of Agriculture in all cases where the regulations require an inspection to be made.

ANIMALS FROM THE UNITED STATES.

HORSES, MULES AND ASSES.

Sec. 33.—The importation of branded or range horses, mules and asses, other than those which are gentle and broken to harness or saddle, is prohibited.

Sec. 34.—Horses, mules or asses, shall be inspected, and if so ordered by the Minister, may be detained, isolated, dipped, or otherwise treated, or in default of such order, where the inspector has reason to believe or suspect that the animals are affected with, or have been exposed to contagious or infectious disease.

Sec. 35.—Horses, mules and asses must be accompanied by:—

(*a*) A satisfactory certificate of mallein test dated not more than thirty days prior to the date of entry, and signed by an inspector of the United States Bureau of Animal Industry; or,

(*b*) A similar certificate from a reputable veterinarian, provided such certificate is endorsed by an inspector of the said Bureau of Animal Industry; or,

(*c*) A similar certificate from an inspector of the Canadian Department of Agriculture.

When not so accompanied, such horses, mules or asses must be submitted to the mallein test either at the quarantine station where entry is made, or, under such restrictions as the Veterinary Director General may prescribe, at point of destination.

Sec. 36.—When tested at the port of entry, if any reactors are found they shall be slaughtered without compensation, or definitely marked and returned to the United States, and must not again be presented for entry. All horses, mules or asses in the same consignment shall be returned to the United States, but the non-reactors may be again presented for entry and further test after the lapse of a period of not less than fifteen days from the date of the first test, provided that satisfactory evidence is produced to the effect that they have not, during the said period, been in contact with affected animals. When tested at destination points all animals reacting to the test will be slaughtered without compensation, while those comprising the rest of the shipment will be detained in quarantine until it is shown to the satisfaction of the Veterinary Director General that they are free from disease.

Sec. 37.—No compensation will, under any circumstances, be paid for horses reacting to mallein within six months after the date of their importation into Canada.

CATTLE.

Sec. 38.—All cattle shall be inspected, and if so ordered by the Minister, may be detained, isolated, submitted to the tuberculin test, dipped or otherwise treated, or in default of such order, where the inspector has reason to believe or suspect that animals are affected with or have been exposed to contagious or infectious disease.

Sec. 39.—Cattle for breeding purposes and milk production six months old or over, if unaccompanied by a satisfactory tuberculin test chart dated not more than thirty days prior to the date of entry and signed by a veterinarian of the United States Bureau of Animal Industry, must be detained in quarantine for one week or such further period as may be deemed necessary, and subjected to the tuberculin test; cattle reacting thereto must be returned to the United States or slaughtered without compensation.

Sec. 40.—Importers may be required to furnish a statutory declaration that the chart produced applies to the cattle it purports to describe and no other.

OTHER RUMINANTS.

Sec. 41.—All sheep and goats shall be inspected, and, if so ordered by the Minister, may be detained, isolated, dipped or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that the animals are affected with or have been exposed to contagious or infectious disease.

SWINE.

Sec. 42.—All swine must be accompanied by a certificate signed by a veterinarian of the United States Bureau of Animal Industry, stating that neither swine plague nor hog cholera has existed within a radius of five miles of the premises in which they have been kept for a period of six months immediately preceding the date of shipment, but such swine shall nevertheless be inspected, and shall be subjected to a quarantine of thirty days before being allowed to come in contact with Canadian animals.

ANIMALS FOR EXHIBITION.

Sec. 43.—Animals other than swine may be admitted at quarantine and inspection ports only, for purposes of exhibition or other temporary stay, subject to the usual Customs regulations.

ANIMALS FOR TRANSIT THROUGH CANADA.

Sec. 45.—The transit of such animals shall be subject to such regulations as the Minister shall, from time to time, prescribe.

ANIMALS FROM MEXICO.

Sec. 46.—Any person contemplating the importation of animals from Mexico must, in addition to all other requirements of this order, first obtain from the Minister a permit therefor.

Applications for such permits shall be in writing, and shall state the number and kind of animals to be imported, the district and state in Mexico whence they are to be shipped and the probable date of their arrival at and the name of the Canadian port of entry. The statements contained therein may be required to be verified on oath, the Minister deciding in every case whether a permit will be granted.

MEXICAN ANIMALS BONDED THROUGH UNITED STATES TERRITORY FOR ADMISSION TO CANADA.

Sec. 47.—Animals passing in bond through United States territory for importation into Canada must be accompanied by a certificate of health signed by a veterinarian of the United States Bureau of Animal Industry, and by an affidavit from the owner or importer that the said certificate refers to the animals in question. Such animals shall nevertheless be subject to inspection, and if necessary to detention, before being permitted to enter Canadian territory. If found diseased such animals are to be subject to and dealt with according to the orders of an inspector under instructions from the Veterinary Director General.

HORSES, MULES AND ASSES.

Sec. 48.—The importation of branded or range horses, mules and asses other than those which are gentle and broken to harness or saddle is prohibited.

Sec. 49.—All horses, mules and asses shall be inspected and shall be submitted to the mallein test before being allowed to enter Canada. If any reactors are found they shall be slaughtered without compensation.

CATTLE.

Sec. 50.—All cattle shall be inspected and if so ordered by the Minister may be detained, isolated, submitted to the tuberculin test, dipped or otherwise treated, or, in default of such order where the inspector has reason to believe or suspect that animals are affected with or have been exposed to contagious or infectious disease.

OTHER RUMINANTS.

Sec. 51.—All sheep and goats shall be inspected, and if so ordered by the Minister may be detained, isolated, dipped or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that the animals are affected with or have been exposed to contagious or infectious disease.

SWINE.

Sec. 52.—All swine shall be inspected and shall be subjected to a quarantine of sixty days before being allowed to come in contact with Canadian animals.

ANIMALS FROM NEWFOUNDLAND.

Sec. 53.—All animals imported from Newfoundland shall be inspected and if so ordered by the Minister, may be detained, isolated, tested, dipped or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that animals are affected with or have been exposed to contagious disease.

REGULATIONS OF QUARANTINE.

Sec. 55.—Animals in any quarantine station shall be treated and dealt with under the direction of the superintendent of the said station and all articles used for, about or in connection with the said animals shall be in like manner subject to his direction and supervision.

Sec. 56.—Cattle six months old or over imported from countries other than the United States, Newfoundland and Mexico, shall not be discharged from quarantine until they have been submitted to the tuberculin test by the superintendent of the quarantine or other duly authorized office.

Sec. 57.—Cattle reacting to the tuberculin test, but not showing clinical symptoms, shall be permanently marked in the right ear with the letter 'T' by the officer making the test, and may then be released at the expiry of the prescribed period of quarantine if found free from all other infectious or contagious diseases.

Sec. 58.—Cattle showing clinical symptoms of tuberculosis shall be destroyed or otherwise disposed of as the Minister may direct.

Sec. 59.—The Minister or the Veterinary Director General may authorize the destruction of any quarantined animal or all or any portion of the articles used in the care of the said animals, and such destruction shall take place under the supervision of the superintendent, and in the manner prescribed by him.

Sec. 60.—The expenses of feeding, treating and caring for animals detained in quarantine, with the exception of those for the use of grounds and shelters, shall be borne by the owner or importer, and such expenses shall be paid before the animals are permitted to leave the quarantine, and in default of such payment within four-

teen days after the expiration of the period of quarantine, the superintendent may on fourteen days' notice in writing, delivered or sent by mail to the owner or importer, cause the said animals to be sold to meet the said expenses, together with the expenses of and incidental to the sale of the said animals, the balance, if any, to be handed over to the owner.

Sec. 61.—No animal under quarantine shall be allowed to come in contact with any Canadian animal until duly discharged from quarantine.

Sec. 62.—No animal under quarantine shall be removed from a quarantine station until duly discharged therefrom by the superintendent or other duly authorized officer.

Sec. 63.—No person shall remove or attempt to remove any animal from a quarantine station without the authority of the superintendent or other duly authorized officer.

Sec. 64.—No indemnity shall be allowed for any injury or loss sustained in connection with any animals while detained in quarantine.

UNITED STATES REGULATIONS GOVERNING THE FREE ADMISSION OF CANADIAN BRED ANIMALS FOR BREEDING PURPOSES.

Previous to January 1, 1911, animals for breeding purposes when imported by citizens of the United States were given free customs entry when recorded in United States books of record and import certificates issued by United States record associations presented to collectors at the point of entry into the United States. Since January 1 animals are admitted on certificate of pure breeding issued from the Bureau of Animal Industry at Washington. The following are extracts from the United States Regulations B.A.I., Order 175:—

REGULATION 1.—CERTIFICATION OF PUREBRED ANIMALS.

SECTION 2. *How to Obtain Certificates.*—In order to obtain such certificates of pure breeding, importers shall conform to the following procedure:

Paragraph 1. *Application for Certificates.*—An application for certificates shall be made to the Bureau of Animal Industry on forms furnished or approved by the Department showing the number of animals to be imported, the breed and sex, the port of shipment, the port of entry into the United States, the name of vessel by which shipped, and the probable date of arrival. This application may be signed either by the owner, the importer, or the agent, stating the name and address (in the United States) of the owner of the animal or animals.

Paragraph 2. *Certificates of Pedigree.*—Certificates of registration and pedigree for said animal or animals, issued by the custodian of one of the books of record given in regulation 2, section 4, of this order, shall be furnished to the Bureau of Animal Industry with the application.

Paragraph 3. *Vendor's Certificates.*—A certificate from the seller or his agent shall be furnished to the Bureau of Animal Industry with the application, giving the name and registry number of each animal sold to the importer, the date of sale, the place of purchase, and the name and address (in the United States) of the purchaser. Vendor's certificates furnished by the custodians of foreign books of record, containing the above information, may be used; otherwise, the form of vendor's certificate furnished or approved by this department must be used.

SECTION 3. Applications will be given consideration by the department in the order in which they are received. When the application and accompanying papers are satisfactory, certificates to that effect will be issued promptly and forwarded to the inspector of the Bureau of Animal Industry at the port of entry or at the station

where the animals are quarantined, which officer will compare the animals imported with the data furnished in the foreign pedigree certificates and where satisfactory, both the foreign pedigree certificates and the certificates of the Bureau of Animals Industry will be given to the owner, importer, or agent. All papers for animals which do not meet the requirements of this order will be retained or returned in the discretion of the department.

SECTION 4. *Eligibility of Animals.*—Where the provisions of this order have been otherwise complied with, animals will be certified as purebred which have been fully registered in good faith in one of the books of record for one of the recognized breeds given in regulation 2, section 4, of this order, except those which have been registered on inspection.

(NOTE.—See amendments to this section below).

REGULATION 2.—CERTIFICATION OF RECOGNIZED BREEDS.

SECTION 4, paragraph 2.—*Recognized Breeds and Books of Record in Canada.*—The Canadian National Records are recognized for the following breeds, subject to the same provisions prescribed for books of record across the seas:—

HORSES.

Belgian Draft.
Clydesdale.
Hackney.
Shire.
Suffolk.
Welsh Pony and Cob.
Standard Bred

CATTLE.

Aberdeen-Angus.
Ayrshire.
French Canadian.
Galloway.
Guernsey.
Hereford.
Jersey.
Red Polled.
Shorthorn.

SHEEP.

Cheviot.
Cotswold.
Dorset Horn.
Hampshire.
Hampshire.
Leicester.
Lincoln.
Oxford Down.
Shropshire.
Southdown.
Suffolk.

HOGS.

Berkshire.
Duroc-Jersey.
Poland-China
Tamworth.
Yorkshire.

AMENDMENT 1 TO B.A.I ORDER 175.

MODIFYING PARAGRAPH 2, SECTION 4, REGULATION 2, REGARDING THE RECOGNITION OF ANIMALS REGISTERED IN THE CANADIAN NATIONAL RECORD.

Effective on and after January 1, 1911.

Paragraph 2, section 4, regulation 2, of the regulations issued by the Secretary of Agriculture, under date of November 25, 1910, regarding the recognition of specified breeds of horses, cattle, sheep and hogs registered in the Canadian National Records, is hereby modified so as to provide that no animal or animals registered in the Canadian National Records shall be certified by the Secretary of Agriculture as purebred, except those which trace, in all crosses, to registered animals in the country where the breed originated.

AMENDMENT 4 TO B.A.I. ORDER 175.

MODIFYING REGULATION 2, SECTION 4, PARAGRAPH 2, AND AMENDMENT 1 REGARDING THE RECOGNITION OF ANIMALS REGISTERED IN THE CANADIAN NATIONAL RECORDS.

Effective on and after June 1, 1911.

Regulation 2, section 4, paragraph 2, of the regulations issued by the Secretary of Agriculture under date of November 25, 1910, and amendment 1, thereto issued December 30, 1910, regarding the recognition of specific breeds of horses, cattle, sheep and hogs registered in the Canadian National Records is hereby modified so as to provide that no animal or animals registered in the Canadian National Records shall be certified by the Secretary of Agriculture as pure bred except those which trace, in all their crosses, to registered animals in the country where the breed originated, or to animals which are proved to the satisfaction of the department to be of the same breed and that have been imported into the United States or Canada from the country in which the breed originated.

ONLY CITIZENS OF THE UNITED STATES MAY IMPORT FREE OF DUTY.

(Extracts from United States Treasury Department Regulations.)

IMPORTATON OF ANIMALS FOR BREEDING PURPOSES.

Beginning January 1, 1911, there will be required, in order to obtain the free entry of animals imported for breeding purposes under paragraph 492 of the Tariff Act of August 5, 1909, evidence as follows:—

1. The affidavit of the importer that he is a citizen of the United States and that the animals are imported specially for breeding purposes. This affidavit will be considered in connection with the circumstances of the importation, and any further evidence required which the collector may deem necessary to establish the allegations.

The fact that the animals are pure bred, or a recognized breed, and accompanied by proper certificate, establishes their status as breeding animals. The use of such animals incidentally for driving or working is not inconsistent with the requirements for free duty.

2. A certificate from the Department of Agriculture, stating that the animals are pure bred, of a recognized breed, and duly registered in the foreign book of record established for that breed. With this certificate there must also be produced and submitted to the collector the certificate of record and pedigree on which the certificate of the Department of Agriculture is based, together with the affidavit of the owner, agent, or importer that such animals are identical with those described in the said certificate.

In case any of the foregoing evidence can not be furnished at the time of the arrival of the animals, a voluntary bond may be given by the importer in double the amount of the estimated duties, conditioned for the production of the required evidence within six months, which bond may be extended in exceptional cases for a like period on application to the secretary of the treasury, and shall be cancelled only upon the production of the evidence for which it is given or upon payment of full liquidated duties. Should the importer so elect, estimated duties may be paid and a written stipulation filed with the collector within 10 days thereafter to produce the evidence within six months from the date of entry, whereupon the final liquidation will be suspended until the production of the evidence or the expiration of the six months.

It will be observed from the foregoing that only citizens of the United States may import animals free of duty and that only such animals as trace in all their crosses to registered animals in the country where the breed originated, or to animals which are proved to the satisfaction of the Department of Agriculture, Washington, to be of the same breed and that have been imported into the United States or Canada from the country in which the breed originated.

The Bureau of Animal Industry at Washington furnishes form of vendor's certificate and form on which to make application for certificate of pure breeding. An export certificate embracing these forms may be procured from the Canadian National Record Office. If application for export certificate is made the same must be accompanied by an application for the transfer of ownership to the United States purchaser.

If further information is required, communicate with the Canadian National Records, Ottawa, Canada.

EXTRACTS FROM REGULATIONS FOR THE INSPECTION AND QUARANTINE OF HORSES, CATTLE, SHEEP, SWINE AND OTHER ANIMALS IMPORTED INTO THE UNITED STATES.

GENERAL PROVISIONS.

Ports of Import and Quarantine and Inspection Stations.

Regulation 1.—With the approval of the secretary of the Treasury, the following-named ports, sub-ports, and customs stations are hereby designated as quarantine stations, and all horses, cattle, sheep, and other ruminants, and swine imported into the United States and which are subject to both quarantine and inspection must be entered through said stations, viz.: On the Atlantic seaboard, Boston, Mass., New York, N.Y., and Baltimore, Md. On the Pacific seaboard: San Francisco and San Diego, Cal., and Port Townsend, Wash. Along the boundary line between the United States and Mexico: Campo and Calexico, Cal., Norgales, Ariz., El Paso, Eagle Pass, Laredo, Rio Grande City, Edinburg, and Brownsville, Tex. Along the border or boundary line between the United States and Canada: Vanceboro, Houlton, Van Buren and Fort Fairfield, Me.; also Lowelltown, Me., (port of Bangor, Me.), for a part of each year beginning August 15 and continuing during the months of September, October and November (Aug. 15 to Nov. 30, inclusive); Beecher Falls, Island Pond, Newport, Richford, St. Albans, and East Alburg, Vt.; Rouses Point, Hogansburg, Massena, Ogdensburg, Cape Vincent, Clayton, Charlotte, Niagara Falls, and Buffalo, N.Y.; Detroit, Port Huron and Sault Ste. Marie, Mich.; and Pembina, N. Dakota.

The following named stations are designated for the entry of animals which are subject to inspection, but not to quarantine, viz.: Eastport and Calais, Me.; Derby Line, North Troy, Alburg and Swanton, Vt.: Mooers Junction, Chateauguay, Fort Covington, Malone, Waddington, Morristown, Lisbon and Alexandria Bay, N.Y; Blaine, Sumas and Seattle, Wash.

Papers by United States Consuls.

Regulation 12.—United States consuls should give clearance papers or certificates for animals from their districts intended for exportation to the United States only upon presentation of permits as above provided with dates of probable arrival and destination corresponding with said permits, and in no case for a number in excess of that mentioned therein. When such shipments originate in the interior of a foreign country these permits should be submitted to the consul of that district and through the following agent to the consul at the port of embarkation.

CANADA.

Affidavit to Accompany Animals.

Regulation 35.—All animals imported into the United States from the Dominion of Canada shall be accompanied by an affidavit made by the owner or importer, declaring clearly the purpose for which said animals are imported, viz., whether for breeding purposes, for milk production, for work, for grazing, feeding, or slaughter, or whether they form part of settlers' effects, or whether they are horses entered for temporary stay, as provided by regulation 36. Said affidavits shall be presented to the collector of customs at the port of entry, who will decide whether the animals are entitled to entry under these regulations, and who will notify the inspector of the Bureau of Animal Industry in all cases where the regulations require an inspection to be made.

Horses.

Regulation 36.—Horses for breeding, racing, show, and sale purposes, for grazing or for work, shall be inspected at the port of entry, and when so ordered by the chief of the Bureau of Animal Industry must be accompanied by a satisfactory certificate of mallein test signed by an official Canadian veterinarian or by an inspector of the Bureau of Animal Industry. Those belonging to the Indian tribes and settlers or immigrants and those used in connection with stock raising (cow ponies) or mining, and those for temporary stay at points along the frontier not exceeding two weeks, whether for pleasure, driving, or teaming, shall be required to pass a veterinary inspection at the port of entry by an inspector of the Bureau of Animal Industry; or they may be admitted without inspection upon written permission from the Secretary of Agriculture first had and obtained: Provided, however, That neither inspection by an inspector of the Bureau of Animal Industry nor written permission from the Secretary of Agriculture shall be required for Canadian horses for pleasure, driving, or teaming, whether driven or ridden into the United States for a temporary stay not to exceed three days. The same rule will apply to American horses returning to the United States from Canada after a stay in Canada not to exceed three days. Horses admitted in bond for export from the United States shall be subject to inspection at any point at which this department has inspectors stationed.

Cattle.

Regulation 37.—Cattle for breeding purposes, milk production, grazing or feeding must be inspected and must be accompanied by a certificate signed by a Canadian Official veterinarian, stating that no contagious disease affecting cattle, except tuberculosis and actinomycosis, has existed in the district in which the animals have been kept for six months preceding the date of importation. The owner must present an affidavit that said certificate covers the cattle in question.

Tuberculin Test for Cattle.

Regulation 38.—Cattle over 6 months old for breeding purposes and milch cows shall also be accompanied by a satisfactory certificate of tuberculin test (which test shall have been made within 30 days of the date of importation by a veterinarian in the employ of and receiving a salary from the Canadian government or by an inspector of the Bureau of Animal Industry), giving the date and place of testing and a description of the cattle, with the age and markings.

Cattle for Exhibition Purposes.

Regulation 39.—The Chief of the Bureau of Animal Industry may, however, by written order, waive the foregoing tuberculin-test requirement for cattle which are to

be imported temporarily for exhibition purposes, provided such cattle are accompanied by a satisfactory certificate of tuberculin test by a veterinarian in the employ of and receiving a salary from the Canadian Government made not more than six months previously and an affidavit by the owner or importer stating that the said certificate of tuberculin test refers to the cattle in question. Any such cattle which are not sold to remain in the United States shall be returned immediately to Canada at the close of the exhibition. The department must be notified of any Canadian cattle which will remain in the United States, not tested as required by Regulation 38, and the tuberculin test will be applied to them by an inspector of this department before shipment to destination. All cattle, sheep and swine intended for exhibition purposes must be shipped directly to the exhibition grounds and must not be unloaded in any public stockyards.

Cattle Quarantine.

Regulation 40.—All cattle imported for breeding, milk production, grazing, or feeding, when not accompanied by the required affidavit or certificates, must be detained in quarantine for one week at the expense of the owner or importer, under the supervision of the inspector. During this detention a rigid inspection will be made and cattle for breeding or milk production which are over 6 months old will be tested with tuberculin. Animals found free from disease at the end of that period will be released.

Inspection of Cattle.

Regulation 41.—Cattle for slaughter shall be inspected. Those forming part of settlers' effects or belonging to Indian tribes may be admitted through any port without inspection or certification upon written permission of the Secretary of Agriculture first had and obtained. Cattle in bond for export may be admitted without inspection of any of the ports named in regulation 1, in transit to and for export from Portland, Me.; Boston, Mass.; New York, N.Y.; Philadelphia, Pa.; Baltimore, Md.; and Newport News and Norfolk, Va., subject to inspection at the port of export: Provided, that inspection may be required by the Secretary of Agriculture whenever, in his opinion, such inspection is necessary.

Sheep.

Regulation 42.—All sheep imported into the United States from Canada for breeding, grazing, or feeding must be inspected at the port of entry by an inspector of the Bureau of Animal Industry. They must also have been inspected by a veterinarian in the employ of and receiving a salary from the Canadian government, and be accompanied by a certificate signed by him stating that he has inspected the sheep and found them free from disease, and that no contagious disease affecting sheep has existed in the district in which the animals have been kept for six months preceding the date of importation; stating also that they have been twice carefully dipped under his personal supervision, or under the personal supervision of another veterinarian in the employ of and receiving a salary from the Canadian government, in one of the dips approved by the Secretary of Agriculture, as described in regulation 33 of B.A.I. Order 143 as amended. The owner or importer shall present an affidavit that said certificate refers to the sheep in question: It is provided further: That any such sheep which are unaccompanied by the aforesaid certificate showing that they have been twice dipped, as herein prescribed, shall be subjected to a quarantine of 30 days.

Sheep for Slaughter, Export, Etc.

Regulation 43.—Sheep for immediate slaughter and those belonging to Indian tribes or forming part of settlers' effects will be admitted at any port without inspection when accompanied by a certificate of an official veterinarian showing freedom

from disease. Sheep in bond for export will be admitted without inspection when accompanied by such certificate at any of the ports mentioned in regulation 1, in transit to and for export from Portland, Me.; Boston, Mass.; New York, N.Y.; Philadelphia, Pa.; Baltimore, Md.; and Newport News and Norfolk, Va., subject to inspection at the port of export.

Other Ruminants.

Regulation 44.—Ruminants other than cattle and sheep shall be accompanied by affidavits similar to those required for cattle, and when not accompanied by said affidavits, relating to the kind of animals offered for importation, they shall be detained in quarantine one week, or for such period as may be necessary to determine whether or not they are free from disease.

Swine.

Regulation 45.—All swine shall be subject to inspection and shall be accompanied by a certificate signed by a Canadian official veterinarian stating that no swine plague or hog cholera has existed within a radius of 5 miles of the premises in which they have been kept for a period of six months immediately preceding the date of shipment. The owner or importer must present an affidavit that the said certificate covers the swine in question. Swine not accompanied by affidavit and certificate will be subject to a quarantine of two weeks at the expense of the owner or importer, under the supervision of the inspector.

Cars to be Cleaned and Disinfected.

Regulation 46.—The railroad cars used in the transportation of animals specified by these regulations must be thoroughly cleaned and disinfected before such animals are placed therein. All litter from previous shipments must be removed and the car cleaned and whitewashed with the following disinfectant:—

To make 5 gallons of disinfectant proceed as follows: Slake 7½ pounds of lime, using hot water if necessary to start action. Make to a cream with water. Stir in 20 fluid ounces of cresol (commercially known as carbolic acid, liquid) at least 95 per cent pure, and make up to 5 gallons. Stir thoroughly. If to be applied through a spray nozzle, strain through a wire sieve. Stir frequently when applying, and keep covered when not in use.

The interior of the car must be completely covered with this mixture, a sufficient quantity being applied to saturate the woodwork thoroughly.

Unless this regulation is complied with, Canadian animals will not be allowed entry into the United States, and animals from the United States will not be admitted into Canada. The shippers should see that the cars are properly cleaned and disinfected before animals are loaded.

All of which is respectfully submitted.

A. W. Smith, chairman,
Wm. Smith,
John Bright,
Robert Miller,
N. Garneau,
J. E. Brethour,
J. M. Gardhouse.
Jno. W. Brant, secretary.

Ottawa, Canada, January 16, 1912.

SESSIONAL PAPER No. 15b

APPENDIX No. 23.

FURTHER REPORT ON THE DOURINE OF WESTERN CANADA, PART I.

By E. A. Watson, V.S., Assistant Pathologist.

Contents.

The later history of twenty survivors of Dourine:—

I.—Introduction.

II.—Tolerant and naturally recovered mares with immunity against reinfection by 'covering-contact' with Dourine-infected stallions.

III.—Tolerant and naturally recovered mares with immunity against reinfection by 'covering-contact' and by direct inoculation.

IV.—Natural recoveries from naturally acquired infections.

V.—Natural recoveries from experimental infections.

INTRODUCTION.

My earlier reports have included mention of some cases of apparent recovery, acquired tolerance and immunity in mares surviving the disease. Such cases exist not only in the experimental herd of horses under observation and as will be described hereafter, but also, it cannot be doubted, among other herds or horses in districts where Dourine occurs. In the latter such cases are individually unknown and unsuspected for they offer not the slightest evidence of infection, and may be working, bearing offspring and living on in normal health and conditions, quite similarly, in fact, to those of the former which have been for years under close observation and whose history is well known and recorded. It cannot be stated for how many years or for what period of time such tolerant, recovered or immune animals remain as carriers of Dourine. They are not to be considered as so likely to spread the disease, as, for instance, the newly infected stallion, but they may be, at times, capable of infecting a susceptible stallion and thus serve as the starting point of a new centre of disease.

Dourine is one of a group of closely allied diseases caused by infection with certain species of trypanosomes all of which require for their perpetuation a so-called tolerent or immune carrier. Surra, for instance—that fatal disease of horses, mules and oxen of India and other hot countries, is carried by the more or less immune camel. In Africa it has been found that the trypanosomes of Nagana and allied diseases so fatal to domestic stock, especially imported animals, are harboured in the blood of big-game and the more or less immune native cattle, which thus acts as reservoirs for the virus needing only an insect intermediary for its further distribution. In Asia and Africa there may be insect hosts and carriers of Dourine that we know nothing of in this country, but here we know that all that is actually necessary for an apparently indefinite propagation of infection is merely the contact of two mucous surfaces provided the parasite is present in one of them; and further, evidence points to the tolerant or immune mare especially among native and lower breeds—which are far more resistant than highly bred imported animals—as one, at least, of the important carriers to be reckoned with.

In any of the cases enumerated below, tolerance, recovery or immunity as it is indicated must be considered as naturally acquired, that is to say without the aid of any drug or medicinal treatment, for only such untreated cases have been included in this selection.

The "virus" or *Trypanosoma equiperdum* used for inoculation purposes and immunity tests was taken directly from infected horses, from plaques or other oedematous swellings, the 'ordinary strain' being from mares naturally infected, the strains of 'higher' and 'highest' virulence being from foals experimentally infected.

Four diseased stallions were used for covering and attempted reinfection, and each one of these died from the disease.

Acknowledgements.—Dr. J. G. Rutherford has shown much personal interest in these cases and it was on his suggestion and advice that the mares were tested (*a*) for the production of offspring and for sterility, (*b*) by allowing covering contact with the diseased stallions as one of the immunity-tests and (*c*) by breaking and putting them to the strain of steady, hard work in order to test their strength and usefulness and to see whether such measures would be inimical to their health and tolerance.

Dr. S. Hadwen is respensible for the events recorded for the period between September 15, 1905, and November 15, 1906.

II.—Tolerant and Naturally-recovered Mares with Immunity Against Reinfection by 'Covering-contact' with Dourine-infected Stallions.

Mare 2.—Probable Time of Infective Covering, season of 1904.

1906.—Tolerant. Covered once by diseased stallion 31 (July). No symptoms.
1907.—Normal health. Covered once by diseased stallion 72 (August).
1908.—Normal health. Bred once to healthy stallion 30 (August).
1909.—Normal health. Birth of healthy foal.
1910.—Normal health. Not bred.
1911.—Normal health. Bred once to healthy stallion 30. Given hard work.
1912.—Normal health. March 31. The mare shows signs of pregnancy and, in the absence of any relapse or breaking down in health, has shown her ability to resist reinfection, bear offspring and to be usefully employed for work purposes.

Mare 3.—Probable Time of First Infective Covering, Season of 1904.

1906.—Tolerant. Covered 3 times by diseased stallions 31 and 33 (July). Slight vaginal discharge (August).
1907.—Normal health. Covered 3 times by diseased stallion 72 (August).
1908.—Normal health. Not bred. Employed at steady work.
1909.—Normal health. Bred to healthy stallion; continuing at work.
1910.—Normal health. Not bred. Worked for 3 months.
1911.—Normal health. Not bred. Worked for 3 months.
1912.—Normal health. March 31, the mare is now an aged animal, is non-productive of offspring, has shown her resistance to reinfection and usefulness as a hard and steady worker.

Mare 10.—Probable Time of First Infective Covering, Season of 1904.

1906.—Rapid recovery to normal conditions (May). Covered 5 times by diseased stallions 31 and 33 (June-October). No further symptoms.
1907.—Normal health. Covered 3 times by diseased stallion 72 (August-Sept.)
1908.—Normal health. Bred to healthy stallion.
1909.—Normal health. No offspring. Not bred. Broken to harness and work.

1910.—Normal health. Employed as a driving animal for station work.
1911.—Normal health. Employed as a driving animal for station work.
1912.—Normal health. March 31, has indicated an unbroken immunity to reinfection, non-productiveness in offspring, but excellent enduring qualities as a roadster.

Mare 24.—Probable Time of First Infective Covering, Season of 1904.

1906.—Tolerant. Covered 7 times by diseased stallions 31 and 33 (June-August). Swollen vulva and discharge (September).
1907.—Normal health.—Birth of healthy foal. Bred to healthy stallion.
1908.—Normal health? Oedematous swelling (July). Bred to healthy stallion.
1909.—Normal health. No symptoms. Birth of healthy foal. Bred to healthy stallion.
1910.—Normal health. No offspring.
1911.—Normal health to March 31.

Remarks.—Conditions noted during 1908 may have been symptomatic of a brief and transient relapse.

III.—Tolerant and Naturally-recovered Mares With Immunity Against Re-infection by 'Covering-contact' or by Direct Inoculation.

Mare 9.—Probable Time of First Infective Covering, Season of 1904.

1906.—Tolerant. Vaginal changes still slightly symptomatic (?), April-June. Covered 7 times by diseased stallions 31 and 33 (July-September).
1907.—No further symptoms or reactions. Normal time of inoculation of trypanosomes, ordinary strain, February 17. Local symptoms with trypanosome periodicity (May-June). Covered 3 times by diseased stallion 72 (August-September). Injection of serum of diseased stallion 72 (September 16). General symptomatic events and loss of health followed.
1908.—Normal health regained.
1909.—Normal health. No symptoms or relapsing condition.
1910.—Normal health to April 3, when sudden death occurred from colic.

Remarks.—A tolerance or immunity to 'covering-contacts' was broken by direct inoculation, but normal health was subsequently re-established and the degree of immunity probably raised.

Mare 13.—Probable Time of First Infective Covering, Season of 1904.

1906.—Tolerant, or recovered. Covered once by diseased stallion 31 (July 1). Normal health.
1907.—Normal health. Bred to healthy stallion 30 (July 21 and 24).
1908.—Normal health and pregnancy. Foaled, and bred again to stallion 30 (July 27).
1909.—Normal health and pregnancy. Foaled, and bred again to stallion 30 (September 10). Inoculation of trypanosomes, highest virulence (September 14). Fever and loss in weight (October), and rapid recovery to normal health (December).
1910.—Normal health. Given the strain of heavy work for 3 months.
1911.—Normal health. Steady work throughout the year.
1912.—Normal health. Continuing at work.

Remarks.—Immunity to 'covering-contact' after a lapse of 3 years was broken for a brief period by direct inoculation of a strain of highest virulence. Tolerance and normal conditions were quickly regained and the degree of immunity probably raised.

Mare 17.—Probable Time of First Infective Covering, Season of 1904.

1906.—Tolerant or recovered. (1) Covered once by diseased stallion 33 (July 6). Normal health.
1907.—Normal health. (2) Inoculation of trypanosomes, ordinary strain (May 27). No reactions. (3) Inoculation of trypanosomes, mixed strains (October 12). No reactions.
1908.—Normal health. Bred to healthy stallion 30 (August 5).
1909.—Normal health. (4) Inoculation of trypanosomes, higher virulence (February 4). (5) Inoculation of trypanosomes, highest virulence (May 21). Gave birth to a healthy foal (June 30).
1910.—Normal health. Broken to work.
1911.—Normal health. Put to the strain of steady and severe work.
1912.—Normal health to date, March 31.

Remarks.—Recovery and immunity strikingly maintained against five attempts at reinfection. The fourth and fifth attempts were made during the period of pregnancy but were not successful in producing either abortion or symptomatic conditions.

Mare 7.—Probable Time of First Infective Covering, Season of 1904.

1906.—Tolerant. Bred to healthy stallion 30 (October 10).
1907.—Normal health. Not pregnant. Inoculation of trypanosomes, ordinary strain, (February 22). Bred to healthy stallion 30 (September 18).
1908.—Normal health. Not pregnant. Bred to healthy stallion 30 (August 3).
1909.—Normal health. Not pregnant. Inoculation of trypanosomes, higher virulence (May 21).
1910.—Normal health. Put to the test of breaking to work.
1911.—Normal health. Mare was destroyed in consequence of a broken leg and injuries sustained in accident during work.

Remarks.—Inoculation failed to break the immunity by the slightest symptomatic reaction or disturbance of health. Always non-productive of offspring, this mare, after breaking to harness, proved a good worker; the teamster driving her for nearly one year reported her as one of the best work animals in his charge and the easiest to keep in good flesh and condition.

Mare 48.—Probable Time of First Infective Covering, Season of 1906, April or May.

1907.—Tolerant. Recovery was indicated at end of year.
1908.—Normal health. Inoculation of trypanosomes, ordinary strain, (Dec. 5).
1909.—Normal health. Inoculation of trypanosomes, higher virulence (Feb. 4).
1910.—Normal health. Broken to saddle and put to the test of hard work.
1911.—Normal health. Driven in harness at steady and hard work.
1912.—Normal health. Continuing at work as one of the Expt. station's best drivers.

Remarks.—Recovery and immunity appears to be well maintained. The mare has exceptional strength and endurance and is an easy animal to keep in good flesh and working condition. Although health is given above as normal it should be mentioned that all through the period of observation, 1907-1912, an abnormal and almost constant sexual excitement has been noted, and at times the mare is nymphomaniacal. The vaginal tract has been frequently searched for trypanosomes but never with success.

IV.—Natural Recoveries From Naturally-acquired Infections in Mares.

Mare 75.—Probable Time of First Infective Covering, Season of 1906.

1907.—Typical local symptoms of Dourine. Little disturbance of health (September). Trypanosomes frequently present in vaginal secretions (September and October).
1908.—Health and conditions variable. Rapid decline in health and loss in flesh following parturition, then rapid recovery to normal.
1909.—Normal health (March-December).
1910.—Normal health.
1911.—Normal health. Broken to harness and put to strain of hard work.
1912.—Normal health. No relapse during or following the period of one year's steady and severe work, ending March 31.

Remarks.—The period of intermittent disease was 2—2½ years, recovery is of 4 years standing. This animal is nervous and highly excitable, and though a good worker is difficult to keep up in flesh and condition.

Mare 82.—Probable Time of First Infective Covering, Season of 1906.

1907.—Typical local symptoms with periodicity of trypanosomes (September-November).
1908.—Slight and rare symptoms. Last appearance of trypanosomes (February 3). Becoming tolerant. Health and condition only little below normal.
1909.—Normal health.
1910.—Normal health.
1911.—Normal health. Broken to harness and heavy wagon-work (March 23).
1912.—Normal health. Returned in fair condition after nearly one year of hard and steady work (March 31).

Remarks.—The period of disease appears to have terminated about two years after first infective covering. The duration of recovery is three years.

Mare 21.—Probable Time of First Infective Covering, Season (1904) or 1905.

1905.—No marked symptoms. Tolerant (September 15).
1906.—No marked symptoms. Ovariectomy performed (September 15) (Warnock and Hadwen).
1907.—Recurrence of local symptoms (July-August), with sexual desire marked.
1908.—Normal health.
1909.—Normal health. Broken to saddle and employed for range work (September 28).
1910.—Normal health. Six months range work.
1911.—Normal health. Six months in range harness.
1912.—Normal health. Returned in good condition (March 31).

Remarks.—The period of active disease appears to have been a very short one. The second year was one of marked tolerance. During the third there was a recurrence of local symptoms. The period of recovery without a relapse is 4 years. The mare is a useful work animal but does not show much endurance for long or hard work, and is difficult to keep up in good condition.

Mare 25.—Probable Time of First Infective Covering, Season of 1905.

1906.—In advanced state of Dourine, paralysis, emaciation, &c. (February 20). Ineo-ordination and paralytic conditions so marked that mare is scarcely able to be moved (December).

1907.—No change in condition; death often looked for (January-March). Commencing improvement (April), and gradual recovery.
1908.—Some loss of control of limbs still noted. General health is fair
1909.—Fair health and condition. Slight loss of control
1910.—Fair health and condition.
1911.—Fair health and condition.
1912.—Fair health and condition.

Remarks.—Period of disease appears as about two years. Recovery of general health and good body condition has been maintained for four years. A slight incoordination or uncertain gait remains to indicate that a part of the lesions of the nervous system are permanent or beyond repair.

V.—Natural Recoveries from Experimental Infections.

Filly 26.—Two years old.

1906.—November 21-December 3. Inoculations of blood of diseased stallion 33.
1907.—Variable health. No definite symptoms. Infection in doubt.
1908.—Fair general health.—Typical local symptoms of Dourine—a 'plaque'—August 28, with tryanosomes present in contents.
1909.—Normal health. No relapse or symptomatic event. Bred to healthy stallion.
1910.—Normal health. No relapse or symptomatic event. Birth of healthy foal.
1911.—Normal health. Broken to harness and put to the test of hard work.
1912.—Normal health. Continuing at work. March 31.

Remarks.—The stallion which supplied the 'virus' for inoculation died of Dourine 6 months later. The infection of the filly-mare was easily tolerated from the commencement and appears to have died out after 2 years duration, recovery being unbroken for 3 years past.

Filly 29.—Seven months old.

1907.—February. Inoculation of trypanosomes, ordinary strain. Feeble health. Periodicity of trypanosomes, and typical symptoms, including knuckling and inco-ordination (March-December).
1908.—Fair health and tolerance (January-July). Relapse, eruption of 'plaques,' eye symptoms, trypanosomes (August-October).
1909.—Normal health and recovery. No relapse or symptomatic event.
1910.—Normal health. Bred to healthy stallion 117 (July 5)
1911.—Normal health. Birth of healthy foal (June 22).
1912.—Normal health to date, (March 31).

Remarks.—The course of the disease was marked by severe symptoms and failing health for the first year; tolerance and relapse in the second, followed by three years of recovery.

Mare 41.—Twenty years old.

1907.—February 17. Inoculation of trypanosomes, ordinary strain. Typical local symptoms and trypanosome periodicity (June-September).
1908.—Fair health and tolerance (January-April). Relapse, eruption of plaques, eye symptoms, trypanosomes (August-November).
1909.—Normal health. No further symptomatic event.
1910.—Normal health.
1911.—Normal health and unvarying fair condition.
1912.—Normal health to date (March 31).

Remarks—A very similar case of infection and recovery to that of the preceding one, though during the disease period there was not nearly so much disturbance of the general health.

Gelding 43.—Two years old.

1907.—April 24. Venous transfusion from Dourine-infected mare 36. Typical symptoms of Dourine, intermittently (September-December).
1908.—Typical symptoms, including inco-ordination and loss of control (February). Tolerance and returning health (April-December).
1909.—Normal health. Broken to saddle and given steady work.
1910.—Normal health. Used for general saddle work at Quarantine Station.
1911.—Normal health. Tested for long distance riding and range work.
1912.—Normal health to date (March 31).

Remarks.—This animal is but a pony, but for strength and endurance is found quite equal to the average native pony of this country. The mare from which the transfusion was made eventually died of Dourine. This pony shows a disease period of about 1 year and recovery of 4 years standing.

Filly 69.—Three years old.

1908.—August 27. Inoculation of trypanosomes taken from a 'plaque.' Typical local oedemas, with trypanosome periodicity (September-December).
1909.—Typical symptoms—vulvar oedema and depigmentation (January-March). Fair general health. Tolerance and recovery. No symptoms (April-December).
1910.—Normal health. Broken to saddle and given 6 months work. No relapse.
1911.—Normal health. Given range-work and tested for endurance, &c.
1912.—Normal health to date (March 31).

Remarks.—The disease duration was a short one, only about seven to eight months, though the symptoms were very typical of Dourine. This has been followed by nearly three years duration of recovery and health.

Filly 1f.—Two months old.

1908.—July 30. Inoculation of blood from diseased mare 36, Dourine. Fever paroxysms (December).
1909.—January 8. Inoculation of trypanosomes of higher virulence. Fever paroxysms, recurring local swellings, trypanosomes (January-December).
1910.—Fever and paralytic or inco-ordinate actions, intermittently (January-April). Tolerance and return to normal health and conditions (May-December).
1911.—Normal health maintained.
1912.—Normal health maintained to date (March 31).

Remarks.—A disease period of 1 year and 8 months noted, with recovery now of 2 years standing.

Filly 5f.—One month old.

1908.—August 26. Inoculation of trypanosomes taken from a 'plaque.' Febrile period, Oedema of *L. pudendi*, trypanosomes present (December).
1909.—Recurring fever, oedema, 'plaques' and trypanosomes (January-September.) Ill-health, fever, wasting condition and paraplegic symptoms (October-December).

1910.—Commencing to recover health and condition (March). Last onset of fever (April). Steady progress to health (May-December).
1911.—Normal health and conditions.
1912.—Normal health and conditions, continuing (March 31).

REMARKS.—The course of the disease was very similar to that in preceding case and for the same period of time, namely 1 year and 8 months No relapse having occurred for nearly 2 years past recovery is indicated.

A. WATSON.

APPENDIX No. 24.

TRYPANOSOMES FOUND IN CANADIAN MAMMALS.

By E. A. Watson, V.S., and S. Hawden, D.V.Sci.

DEPARTMENT OF AGRICULTURE, CANADA.

(Plates I and II.)

Since 1906 trypanosomes have been found in ten species of mammals by officers of the Health of Animals Branch.

Only one of these parasites has been proved to be pathogenic, *i.e.* that of Dourine.

As will be seen by referring to the plates, several of the apparently non-pathogenic forms bear some resemblance to those trypanosomes which are well known to produce fatal diseases.

Other Canadian mammals doubtless harbour trypanosomes and further species will be recorded.

Intense cold seems to have little effect on the range of these parasites, and it is interesting to note that virulent outbreaks of Dourine have occurred in places where the thermometer sometimes drops to 50° and 60° F. below zero. However, the identity or the non-identity of this trypanosome with that of African Dourine remains open to question, and, on similar grounds, the identity of the African with the so-called Indian and European varieties may well be doubted.

The Dourine of Canada appears to be identical with Beschälseuche of East Prussia, the Dourine of Hungary and that of Eastern Europe. In any of these, the trypanosome is rarely, if ever, found in the general circulation of infected animals, but only in the serous or sanguineous fluids of local swellings and infiltrations which are characteristic of the malady; further, they closely correspond in that laboratory, animals are notoriously resistant to them, and there are but very few instances recorded of successful infection, in a rat or rabbit, and no investigator seems to have been able to maintain a laboratory strain for any length of time. These trypanosomes, therefore, show a remarkable difference, biologically, from the parasite of Algerian or African Dourine, which is said to be observable in the general circulation of infected horses, and has been transmitted to and carried along in dogs, rabbits, rats, mice, &c., without difficulty, becoming exceedingly virulent for laboratory animals.

TRYPANOSOMA LEPORIS-SYLVATICUS N. SP. WATSON.

(Pl. I., Fig. 1.)

Found in the 'cotton-tail bush rabbit,' *Lepus sylvaticus*, at Lethbridge, Alberta, November 17, 1906. (Watson.)

This trypanosome has been observed in about 30 per cent of rabbits shot or trapped at the Lethbridge Experimental Station, 1906-1911. Blood infection may be noted at any season of the year but the parasites are present in greater numbers and in a greater percentage of animals during the late fall and early winter months than at any other time. They usually disappear from the blood of rabbits held in captivity after a few days, but occasionally persist for a month or longer period.

The trypanosome is 26·7 μ in average length; it differs from the well-known *lewisi* type in being more slender and elongated, in having a more pronounced undulat-

ing membrane, a more centrally situated trophonucleus, and a larger and more rounded kinetonucleus.

This trypanosome is apparently non-pathogenic for native and domesticated rabbits, mice, and pigeons (Watson.)

TRYPANOSOMA PEROMYSCI N. SP. WATSON.

(Pl. I., Figs. 2, 3.)

Found in northern deer-mice, *Peromyscus maniculatus*, *P. nebracensis*, and other species, Lethbridge, Alberta, December, 1906. (Watson.)

About 20 per cent of these mice are found infected. The seasonal prevalence is similar to that of the rabbit trypanosome. The parasites disappear from the blood of mice held in captivity usually on the second or third day and have never been seen after a period of seven days.

The average length of the trypanosome is 28 μ. The trophonucleus is not so centrally located as in that of the rabbit trypanosome nor as far forward as in *T. lewisi*, and the posterior end of the parasite is narrower than in either of the other two species.

Non-pathogenic for mice and rabbits. (Watson.)

TRYPANOSOMA EQUIPERDUM DOFLEIN, 1901

(Pl. I., Fig. 4.)

The first discovery of the Dourine trypanosome in North America was made at Lethbridge, Alberta, on February 11, 1907, in a naturally infected mare. (Watson and Gallivan.)

Seasonal prevalence: trypanosome periodicity has been noted in horses in every month of the year, not infrequently during the coldest winter months, but the parasite becomes most active, usually, towards the end of a very hot summer season.

Pathogenicity: Different strains of Dourine trypanosomes have been found to vary greatly in virulence. The strain isolated in February, 1907, became exceedingly virulent for horses after eight or nine early passages through young mares and foals.

Dogs, rabbits, mice and gophers were always resistant; white rats were less so, for after a great number of failures to infect with strains of ordinary virulence, a few of these animals were at last successfully infected with the strain which had become so highly virulent for horses, and although the parasites were never seen in the rats' blood, this blood, when injected into horses produced a virulent and fatal infection.

Morphological characteristics: The average length of the parasite is 27 μ. The anterior extremity has a free flagellum, usually of short length: the posterior is frequently blunted or has a sawn-off appearance. The kinetonucleus is very small, smaller than in any of the pathogenic trypanosomes with the exception of *Trypanosoma equinum*, and is frequently associated with, or just posterior to, a vacuole. (Watson.)

"Dourine in Canada." J. G. Rutherford. *The Lancet*, May, 1907.

Special Report on Dourine. *Health of Animals Branch*, Dept. of Agriculture, Canada. Nov. 1907[1].

"Note on the life-history of *Trypanosoma equiperdum*." E. A. Watson, in *Health of Animals Report*, 1909[1].

"An Experimental Study of Dourine." E. A. Watson, in *Health of Animals Report*, 1910[1].

[1] Published by the Department of Agriculture, Ottawa, Canada.

TRYPANOSOMA CITELLI N. SP. WATSON.

(Pl. I., Figs. 5, 6.)

Found in the ground-squirrel or prairie-gopher, *Citellus richardsoni* (Sabine), at Lethbridge, Alberta, on April 5, 1908. (Watson.)

The blood of three ground-squirrels out of 12 examined (March-July, 1908), showed trypanosomes. Unlike the rabbit and mouse infections, in which the parasites are often plentiful, only one or two parasites could be found in each slide preparation of blood of infected animals.

This trypanosome is 35 μ in length and has morphological characters that differentiate it from any other species recorded in this paper. Excepting the giant trypanosome of the cow, it is considerably longer and the body of the parasite terminates anteriorly more abruptly, leaving a long free flagellum. The posterior extremity is very slender and finely pointed, the trophonucleus is elongated and well forward, and the kinetonucleus always appears round, never elliptical or rod-shaped.

Non-pathogenic for gophers, mice and rabbits.

TRYPANOSOMA LEWISI (KENT), 1882.

Found in six rats out of 16 examined at Ottawa, Ont., on January 24, 1907. (Hadwen.)

TRYPANOSOMA, SP. BOWHILL, 1909.

From squirrel's blood. Mount Lehman, B.C., Fig. 31, in *Health of Animals Report*, 1909. (Bowhill.)

TRYPANOPLASMA SP. BOWHILL, 1909.

In blood of cow. Mount Lehman, B.C., Fig. 29. 'Red water investigations in British Columbia' in 'Health of Animals Report,' 1909. (Bowhill.)

No description is given of this parasite; it is probably a large trypanosome instead of a trypanoplasma and may be identical with *T. rutherfordi*, described below.

TRYPANOSOMA RUTHERFORDI N. SP. HADWEN.

(Pl. II., Fig. 10.)

A single parasite was found in the blood of a cow at Mount Lehman, B.C., on April 18, 1910. (Hadwen.)

The parasite appears to be non-pathogenic as the cow was fattened later and killed for beef. A rabbit was inoculated with blood but suffered no ill effects. This giant trypanosome, which measures 55 μ in length, may possibly belong to the *theileri* group. The body of the organism has a broad or stumpy appearance and anteriorly is not finely drawn out as in *T. theileri*, but, on the contrary, terminates somewhat abruptly and has only a very short free flagellum. Posteriorly, a slender filament is extruded from the rounded end of the body. The nucleus is situated posterior to the centre, the endoplasm appears coarsely granular and is profusely vacuolated. No doubt this is an old form of the parasite and probably is at the commencement of degeneration.

TRYPANOSOMA EVOTOMYS N. SP. HADWEN.

(Pl. II., Fig. 7.)

Found in a vole, *Evotomys saturatus* (Rhoads) at Mount Lehman, B.C., on July 7, 1911. (Hadwen.)

A long parasite, average length 26·5 μ, differing from *T. lewisi* in having the nucleus close to the centre, and in possessing a well-developed undulating membrane and a much larger centrosome. The distance between centresome and nucleus is much

less than in *T. leporis-sylvaticus, T. peromysci,* and *T citelli* (compare with Figs. 1, 2, 3, 5 and 6).

Found in two mice out of ten examined.

Non-pathogenic for two rabbits inoculated July 27, 1911, still alive on September 10, 1911. (Hadwen.) Also non-pathogenic for guinea-pigs. (Dr. McKee.)

Trypanosoma soricis n. sp. Hadwen.

(Pl. II., Figs. 8, 9.)

Found in blood of wandering shrew, *Sorex vagrans,*[1] (Baird) at Mount Lehman, B.C., on July 28, 1911. (Hadwen.)

A short active parasite with the nucleus in centre, undulating membrane well marked, and a very short free flagellum. The organism is broad and stumpy and the total length only 17·5 μ. Found in two out of five mice examined. Apparently non-pathogenic.

We are indebted to Dr. J. C. Rutherford, C.M.G., Veterinary Director General, for permission to publish these notes.

[1] These mice were kindly identified by F. Kermode, Curator of the Provincial Museum, Victoria, B.C.

EXPLANATION OF PLATES I AND II.

	Species.	Average length.	Host.
Fig. 1.	*T. leporis-sylvaticus* n. sp. Watson.	26·7 μ	Rabbit, *Lepus sylvaticus.*
Figs. 2 & 3.	*T. peromysci* n. sp. Watson.	28 μ	Mice, *Peromyscus maniculatus, P. nebracensis.*
Fig. 4.	*T. equiperdum* Doflein, 1901.	27 μ	Horse.
Figs. 5 & 6.	*T. citelli* n. sp. Watson.	35 μ	Ground-squirrel, *Citellus richardsoni.*
Fig. 7.	*T. evotomys* n. sp. Hadwen.	26·5 μ	Vole, *Evotomys saturatus.*
Figs. 8 & 9.	*T. soricis* n. sp. Hadwen.	17·5 μ	Shrew, *Sorex vagrans.*
Fig. 10.	*T. rutherfordi* n. sp. Hadwen.	55 μ	Cow.

[From *PARISITOLOGY,* Vol. V, No. 1, March 12, 1912.]

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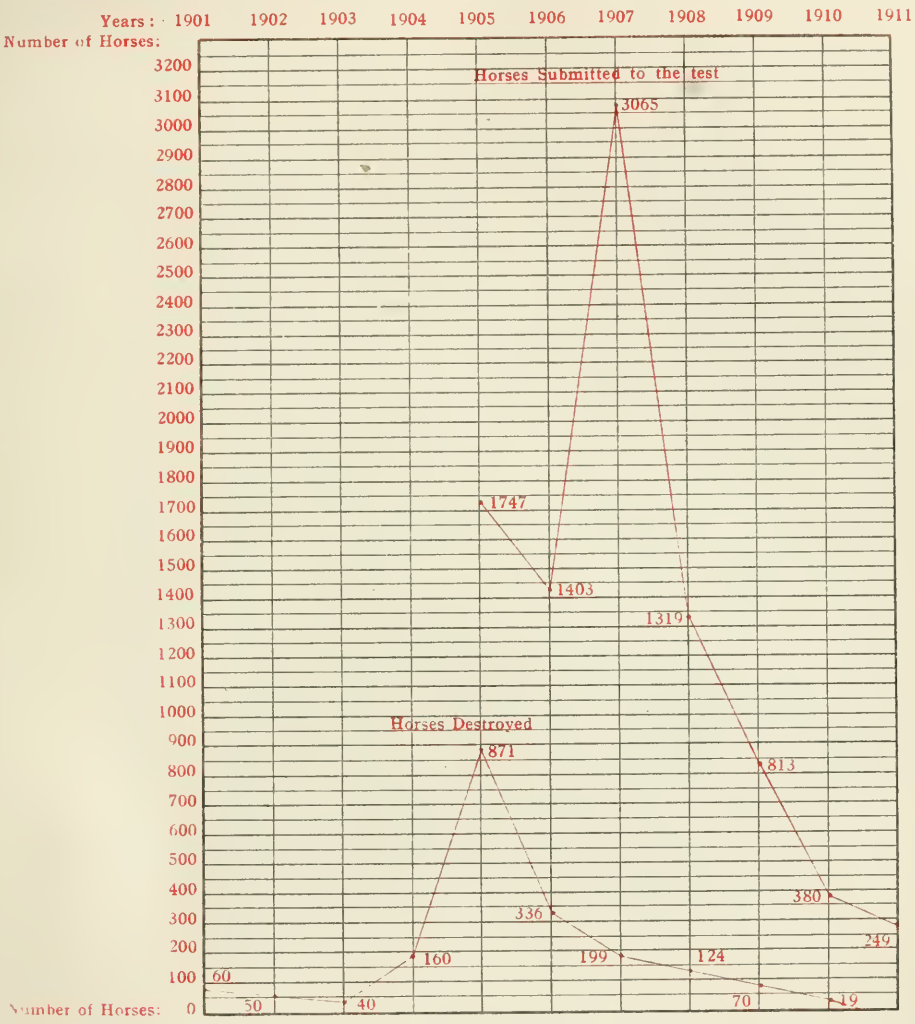
Before proceeding to consider the use of Mallein and other features in connection with the testing of horses, it would seem proper to furnish reliable statistical information regarding Glanders in Manitoba:—*Chart showing number of horses tested with Mallein and number destroyed for Glanders in Manitoba for a period of ten years. Each space on chart represents 50 horses.*

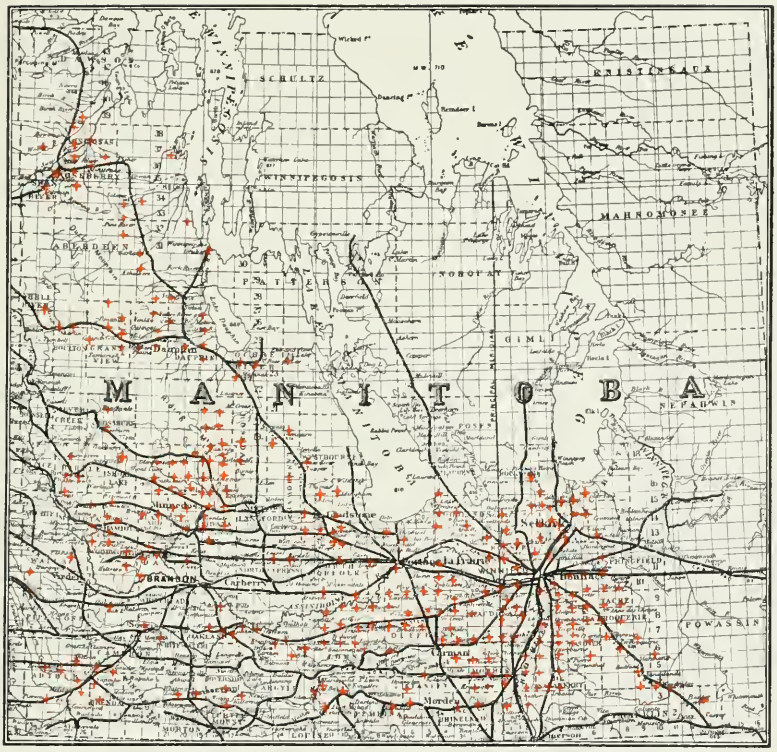


During the years 1901 to 1904 only clinical cases were destroyed. No official records available of number tested.

In 1905 of 1747 horses tested, 871 were destroyed, 365 being clinical cases.
" 1906 " 1403 " " 336 " " 173 " " "
" 1907 " 3065 " " 199 " " 99 " " "
" 1908 " 1319 " " 124 " " 53 " " "
" 1909 " 813 " " 70 " " 29 " " "
" 1910 " 380 " " 19 " " 9 " " "

" 1911—249 horses have been tested and up to present time (Aug. 19th) no cases of Glanders have been discovered. In addition to the above, during the above mentioned period extending from 1905 to 1911, we have submitted to the test 14,850 horses and mules entering at boundary points in Manitoba from the United States.

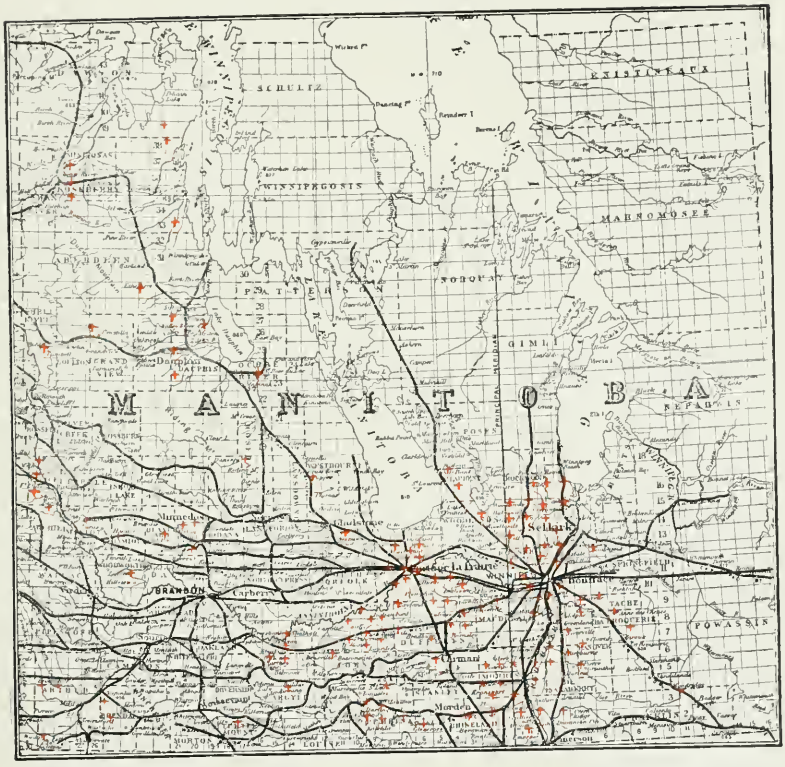
Glanders Outbreaks in Manitoba 1905.



The mark + indicates the location of outbreaks during the year 1905, during this year 1747 horses were tested with mallein, of which 871 were destroyed for glanders, 365 of these being clinical cases.

15c—1913—3

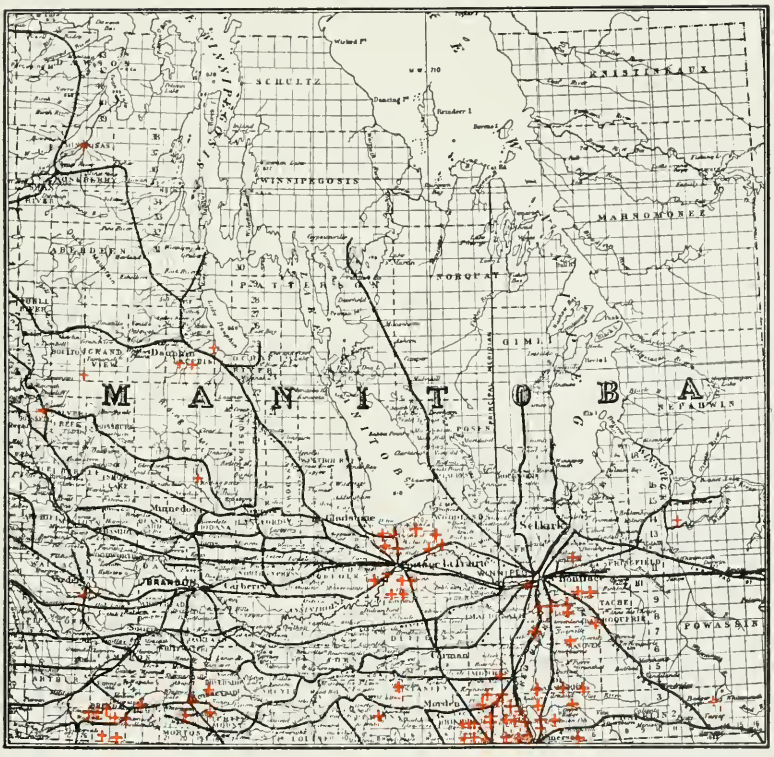
Glanders Outbreaks in Manitoba 1906.



The mark + indicates the location of outbreaks during the year 1906; during this year 1403 horses were tested with mallein, of which 336 were destroyed for glanders, 173 of these being clinical cases.

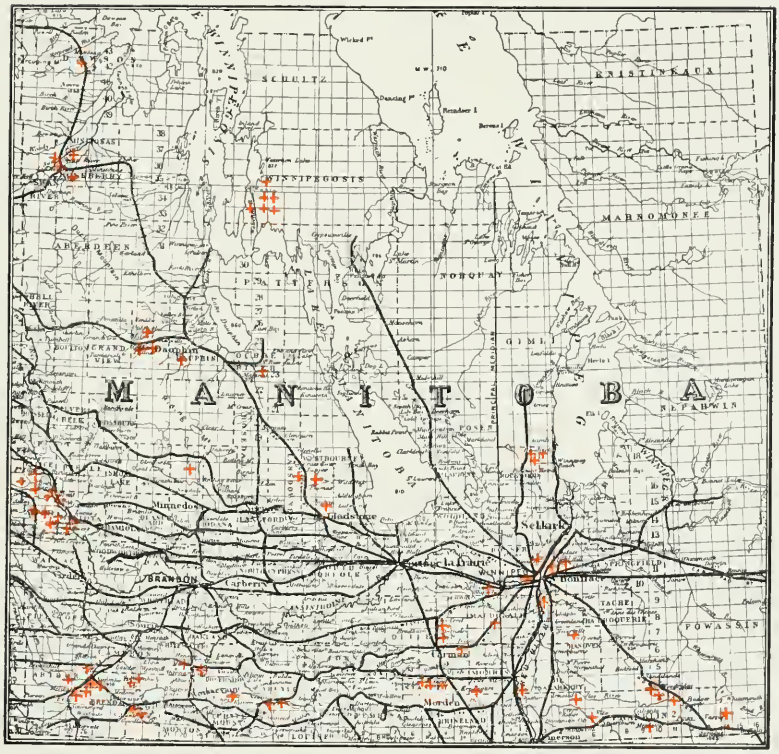
15c—1913—31½

Glanders Outbreaks in Manitoba 1907.



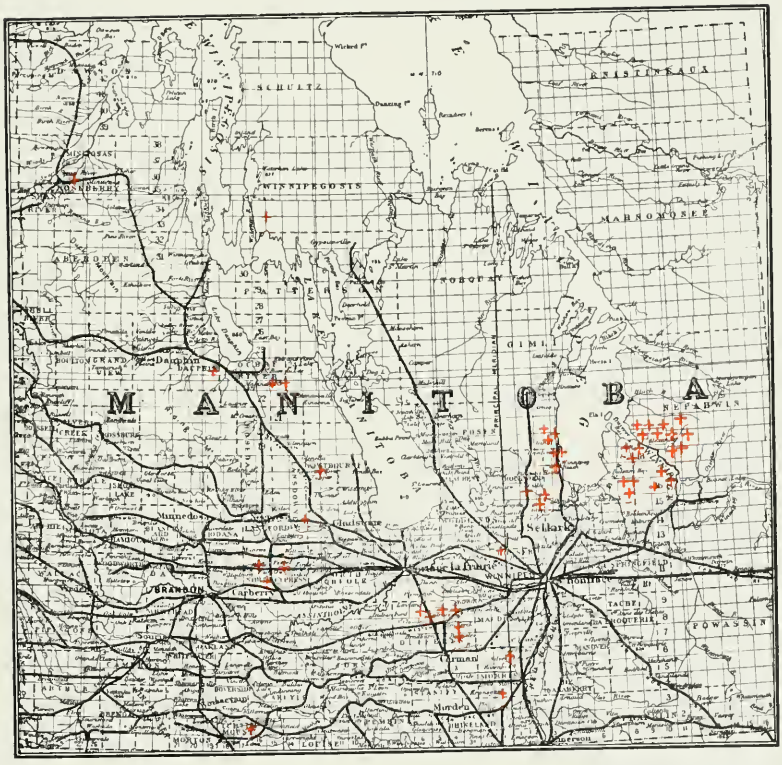
The mark + indicates the location of outbreaks during the year 1907; during this year 3065 horses were tested with mallein, of which 199 were destroyed for glanders, 99 of these being clinical cases.

Glanders Outbreaks in Manitoba 1908.



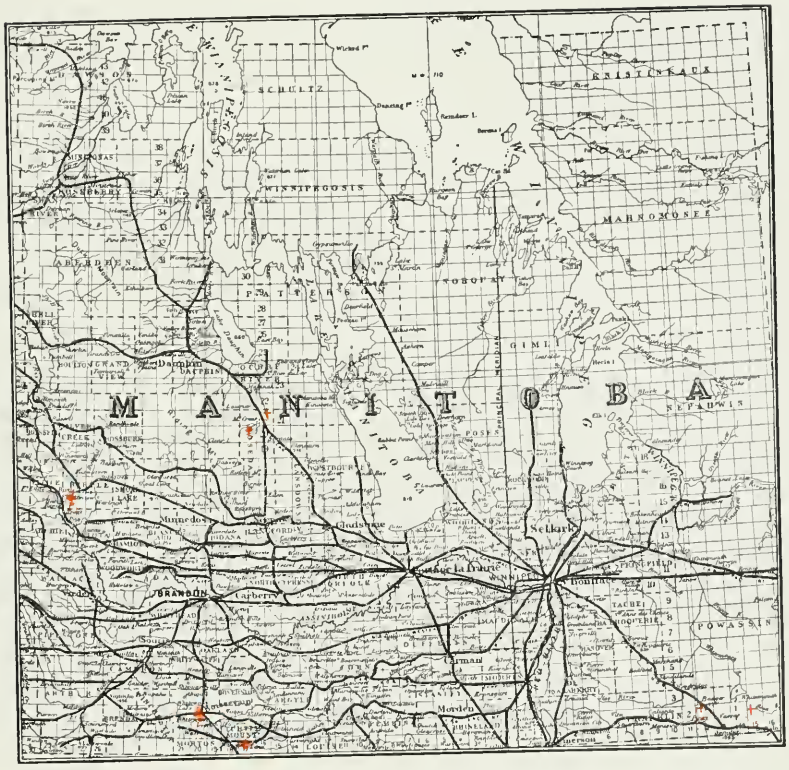
The mark + indicates the location of outbreaks during the year 1908; during this year 1319 horses were tested with mallein, of which 124 were destroyed for glanders, 53 of these being clinical cases.

Glanders Outbreaks in Manitoba 1909.



The mark + indicates the location of outbreaks during the year 1909 ; during this year 813 horses were tested with mallein, of which 70 destroyed for glanders, 29 of these being clinical cases.

Glanders Outbreaks in Manitoba 1910.

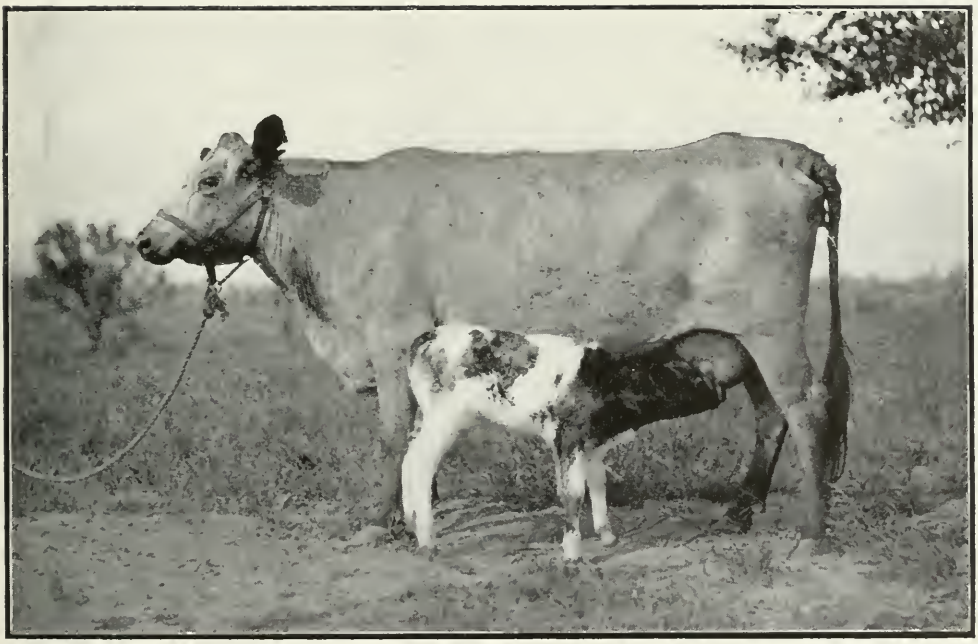


The mark + indicates the location of outbreaks during the year 1910; during this year 380 horses were tested with mallein, of which 19 were destroyed for glanders, 9 of these being clinical cases.

No. 1.—The cow shown in the above picture is apparently healthy, She does not cough, her appetite is good, she seems strong and vigorous and gives an unusually large quantity of milk. At the time her picture was taken it was known that she had been tuberculous at least four years and that she had been passing large numbers of tuberculosis germs from her body at least three years. Since it first became known that the cow is diseased she has given birth to four calves.

No. 2.—The cow shown in the above picture is apparently healthy. She does not cough, her appetite is good, she gives a large quantity of milk and is in excellent general condition for a dairy cow. At the time her picture was taken it was known that she had been affected with tuberculosis at least four years and that she had been passing tuberculosis germs from her body at least three years.

The mixed dung of this cow and of the cow shown in the next picture caused tuberculosis in hogs that were permitted to eat it.



No. 3.—The cow shown in this picture is apparently healthy. She does not cough, her appetite is good and her general condition is excellent for a milk cow that as recently calved. At the time her picture was taken it was known that she had been affected with tuberculosis at least 4½ years and that she had been passing tuberculosis germs from her body for a long time. The calf by her side is the fourth she has produced in the last four years. Small quantities of her dung caused tuberculosis in guinea pigs when it was placed under their skin.

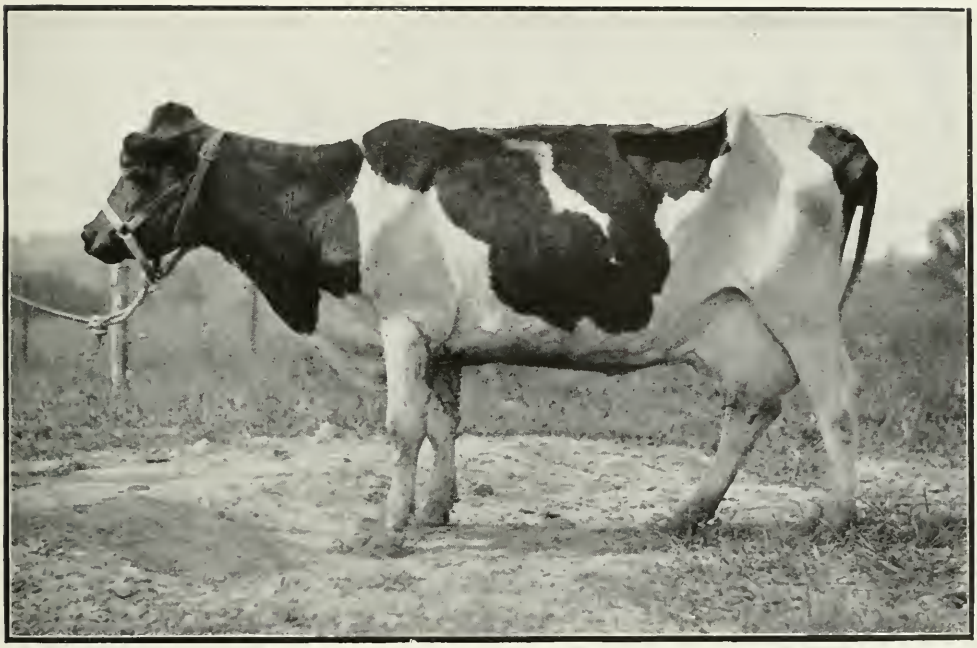
The mixed dung of this cow and of the one shown in the last picture caused tuberculosis in hogs that were permitted to eat it.

No. 4.—The cow shown in this picture is in excellent condition for an animal that has been affected with tuberculosis more than four years. Three years before her picture was taken tuberculosis germs were found in her dung and hogs that were permitted to eat her dung became tuberculous. About 2½ years before her picture was taken it was found that the milk of the cow contained tuberculosis germs. There was nothing visible about her udder to show that it was diseased and it was only after two months of the most careful tests of her milk that an expert could tell from which of the four quarters the disease germs were being passed.

15c—1913—32½

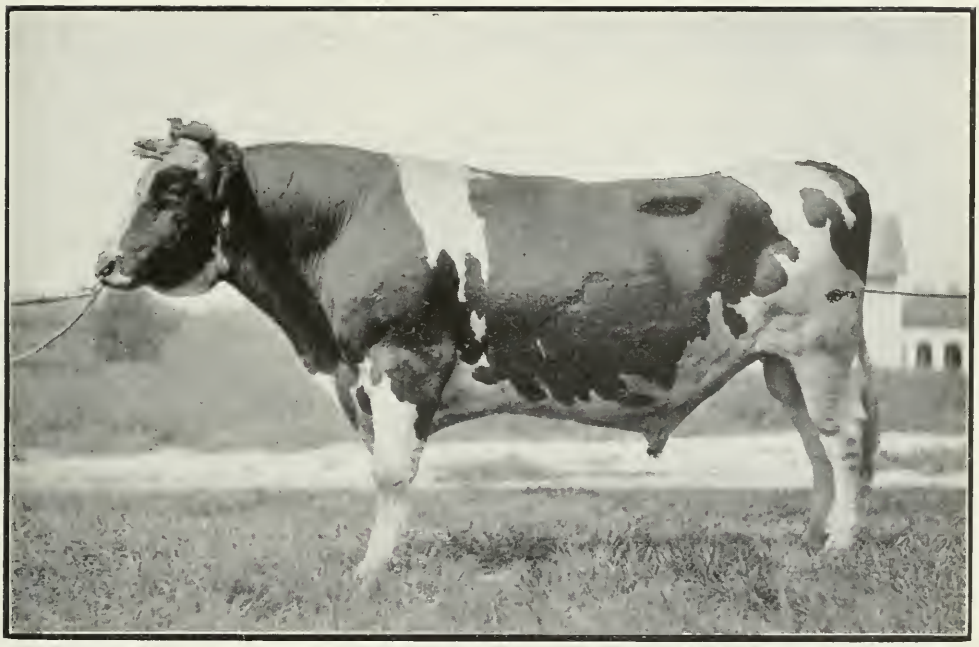
No. 5.—A long standing advanced case of tuberculosis, with large tuberculous swellings in the udder. A year before the above picture was taken the cow was discovered to have udder tuberculosis. This discovery was made by injecting some of her milk into guinea pigs; there was nothing in the appearance or external condition of the udder at first to show that it was diseased.

How very dangerous cows like the one in the picture are may be judged from the fact that calves that are are permitted to drink milk from tuberculous udders only a single time are almost certain to have tuberculosis. A small amount of milk from cows like those in the above picture No. 4, mixed with the milk of other cows, will make the whole of it dangerous for both persons and lower animals.



No. 6.—The cow in the picture is an advanced case of tuberculosis. She is very weak and thin, but is a heavy milker and in her weak condition continues to give an abundant quantity of milk.

Cows of this kind are unfortunately too numerous in dairy herds. The temptation to keep such cows and to use their milk is greater than some persons can resist. Such cows are a great danger to other animals that may come in contact with them and the use of their milk in a raw state is very apt to cause tuberculosis alike in young persons and lower animals.



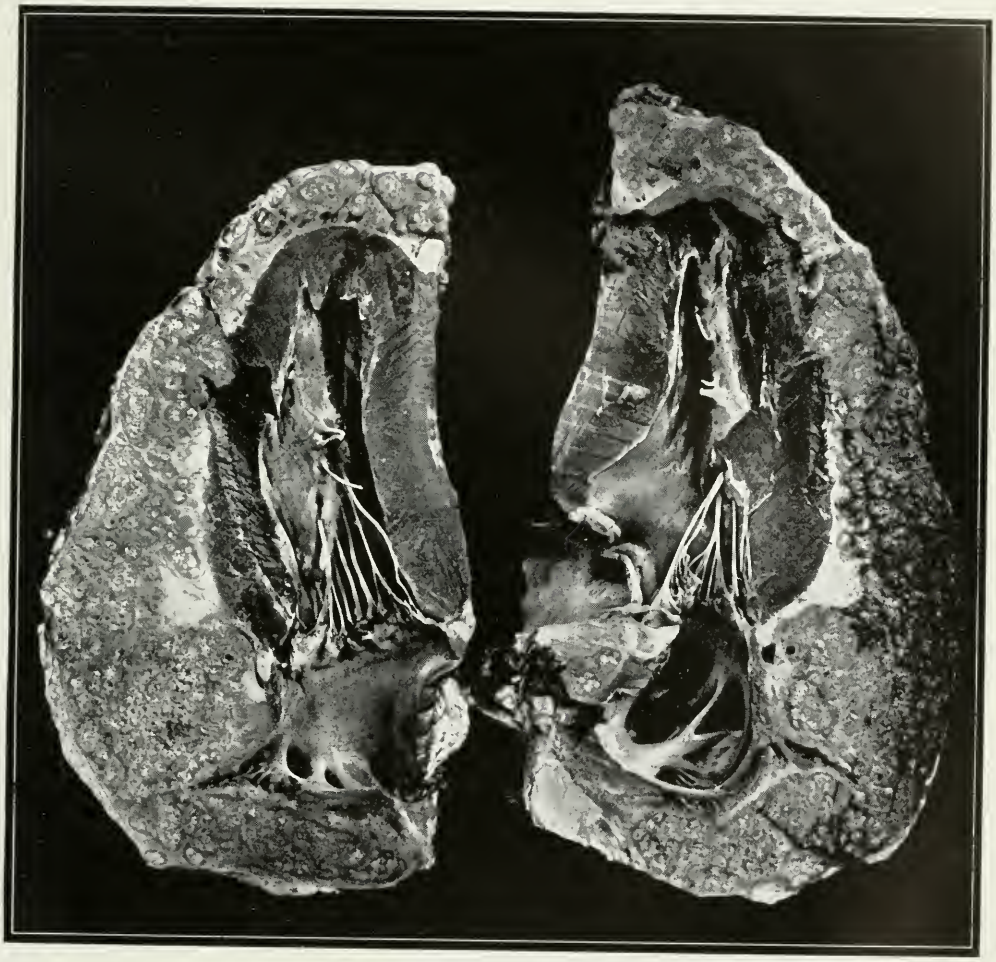
No. 7. —The picture of the bull was taken nearly four years after he was first known to be tuberculous and three years after it was known that he was passing tuberculosis germs from his body

Directly after his picture was taken he was killed, and in addition to numerous nodules of tuberculosis in his lungs it was found, when his body was opened, that nearly all the lymph glands connected with his bowels and liver were diseased. At the time of his death the bull weighed 1,850 lbs., and his apparent condition is excellent for an animal that was fed only rough forage and no grain in any form. The presence of tuberculosis in his body would never have been suspected before his death without the help of the tuberculin test.

No. 8.—Sections of a tuberculous udder from a cow. Practically the whole of the udder from which the sections were taken was changed into tuberculous material. Long before tuberculous udders become as badly diseased as the condition shown in the picture the milk contains large numbers of tuberculosis germs and is very dangerous. A tuberculous udder may contain only a single small tuberculous swelling through which the milk becomes dangerously infected with tuberculosis germs.

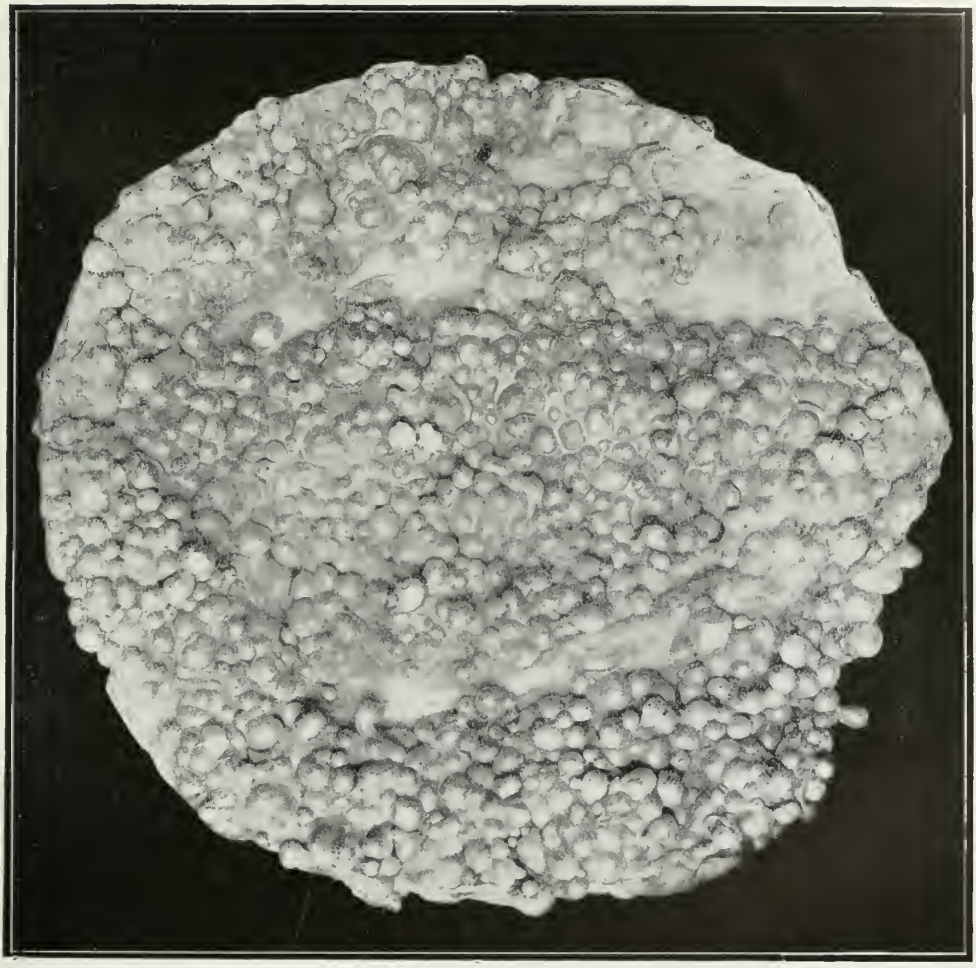
No. 9.—Sections of tuberculous liver from a cow. The light coloured parts in the picture show the disease.

No. 10.—Section of a tuberculous lung from a cow. The picture shows numerous, nearly round tuberculous nodules, one large tuberculous cavity, and several air tubes that extend from tuberculous nodules that are softening and breaking down. When tuberculous nodules in the lungs break down the material of which they are composed, and which contaids millions of tuberculosis germs, is coughed up. Some of the germs are sprayed from the mouth and others are swallowed and discharged with the dung.



No. 11.—Sections of a tuberculous heart from a cow. The light parts are tuberculous. The heart muscle is greatly reduced in volume and is prevented from working properly by the tuberculous material by which it is surrounded. The picture shows how badly an animal may become diseased with tuberculosis before it dies. One reason why tuberculosis is so common among persons and cattle is that many persons and cattle pass tuberculosis germs from their bodies before any one knows or suspects that they have tuberculosis and can give the disease to others.

15c—1913—33



No. 12.—Tuberculosis of the omentum or caul or the net covering the bowels. This form of tuberculosis is known as Pearl Disease, because the tuberculous tumours look like pearls.

No. 13.—Tuberculosis of the omentum or caul or the net covering the bowels. The picture shows another form of Pearl Disease, in which each nodule is about the size of a grape and is composed of a large number of smallar nodules which have grown together.

PLATE I.

Bladder from cow No. 58 showing submucous hæmorrhages, also eroded patch.

PLATE II.

Photo. S. H.

Ixodes angustus ♂ venter surface.

14c—1913—36

PLATE III.

Photo S. H.

Ixodes angustus ♀.
Showing shape of capitulum and scutum.

PLATE IV.

Photo S. H.

Ixodes angustusso.

The capitulum differs markedly from ♂ and ♀. At the base of the palpi two pointed processes are seen, and two auriculae are seen laterally from the base.

Photo S. H.

Ixodes angustus L.

Exhibits the difference between ♂ and ♀ much the same as o.

NOTE—For descriptions see Nuttall, Warburton, etc. (Ticks part II), for life history see page 9 of the article.

PLATE VI.

Photo S. H.

Hæmaphysalis leporis palustris ventral view.

15c—1913—37

Scale 2 inches=1 mile.

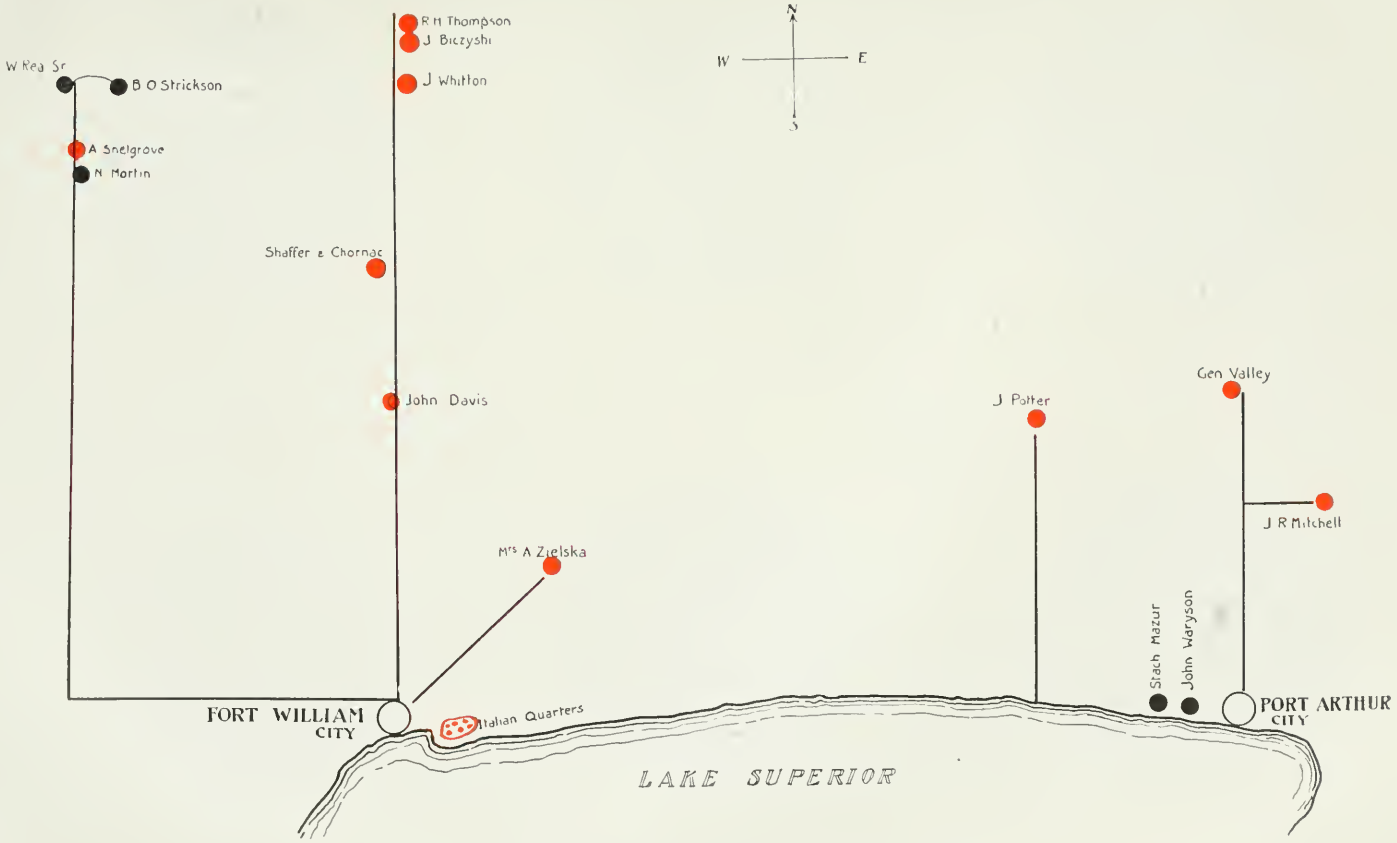


Chart of Hog Cholera infections from uncooked garbage. Page 103.

Fig. 1.

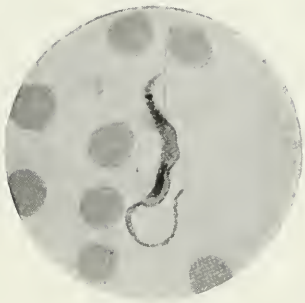


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

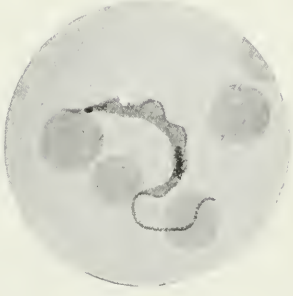


Fig. 6.

15c—1913—39

Fig. 7.

Fig. 8.

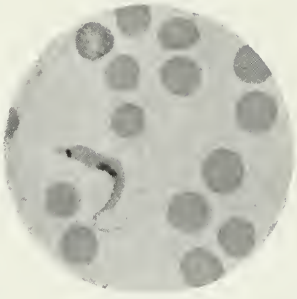


Fig. 9.

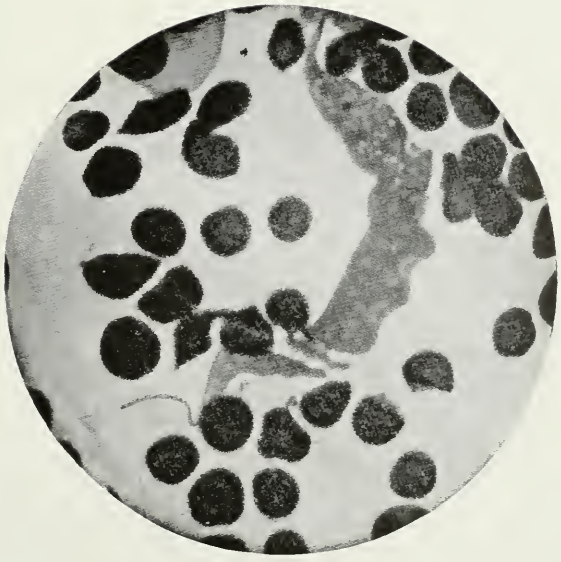
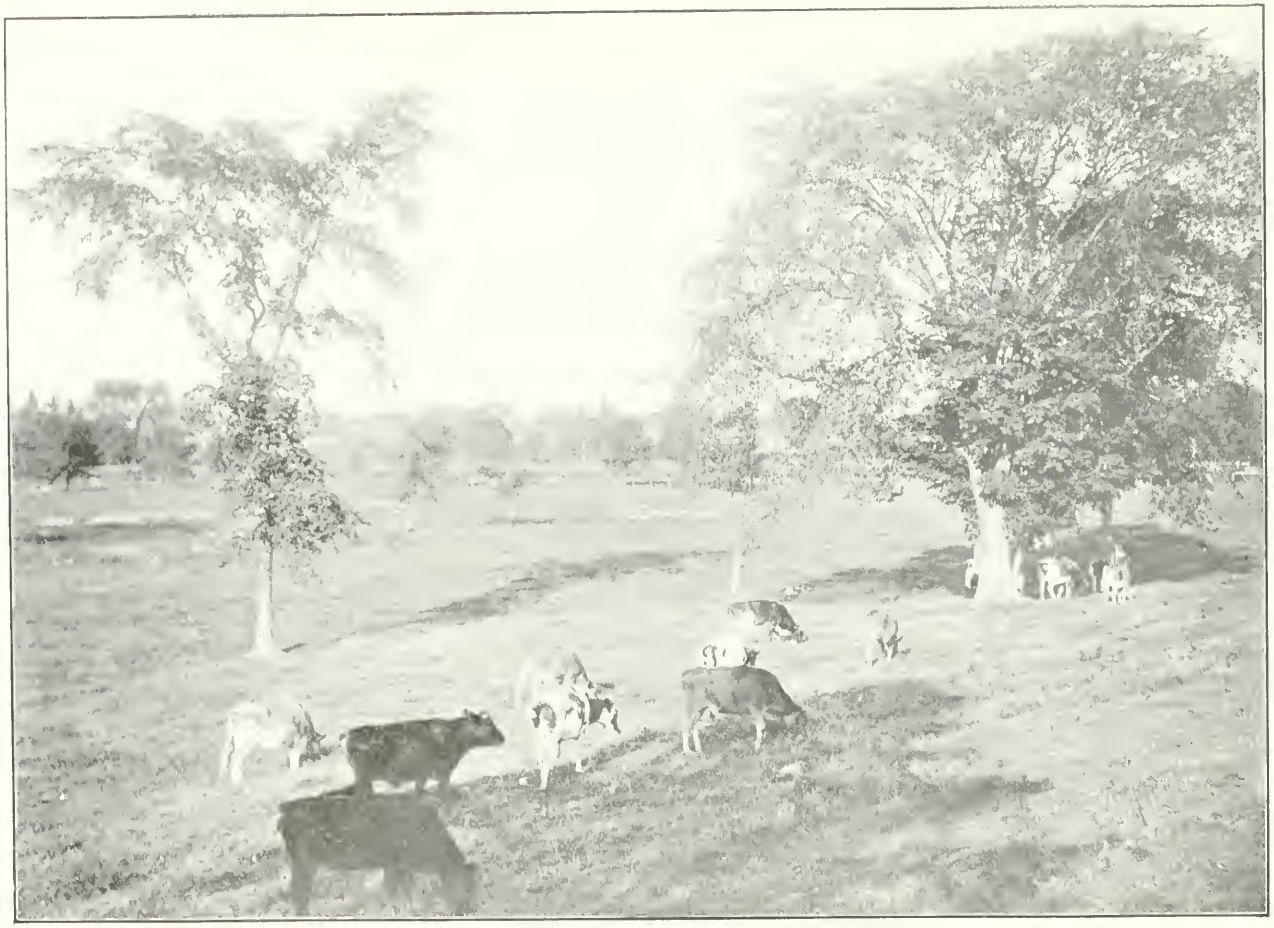


Fig. 10.



Cattle at Pasture on the Central Farm.

APPENDIX TO THE REPORT OF THE MINISTER OF AGRICULTURE

EXPERIMENTAL FARMS

REPORTS

OF THE

DIRECTOR	J. H. GRISDALE, B. Agr.
DOMINION AGRICULTURIST, (Acting)	J. H. GRISDALE, B. Agr.
" HORTICULTURIST	W. T. MACOUN
" CEREALIST	C. E. SAUNDERS, Ph. D.
" CHEMIST	FRANK T. SHUTT, M.A.
" ENTOMOLOGIST	C. GORDON HEWITT, D.Sc.
" BOTANIST	H. T. GÜSSOW
POULTRY MANAGER	A. G. GILBERT
SUPT. EXPERIMENTAL STATION, Charlottetown, P.E.I.	J. A. CLARK, B.S.A.
" " FARM, Nappan, N.S.	R. ROBERTSON
" " STATION, Cap Rouge, Que.	GUS. A. LANGELIER
" " FARM, Brandon, Man.	W. C. McKILLICAN, B.S.A.
" " " Indian Head, Sask.	ANGUS MACKAY
" " STATION, Rosthern, Sask.	Wm. A. MUNRO, B.A., B.S.A.
" " " Scott, Sask.	R. E. EVEREST, B.S.A.
" " " Lethbridge, Alta.	W. H. FAIRFIELD, M.S.
" " " Lacombe, Alta.	G. H. HUTTON, B.S.A.
" " FARM, Agassiz, B.C.	P. H. MOORE, B.S.A.

FOR THE

YEAR ENDING MARCH 31

1912

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1912

[No. 16—1913.]

APPENDIX

TO THE

REPORT OF THE MINISTER OF AGRICULTURE

ON

EXPERIMENTAL FARMS

OTTAWA, March 31, 1912.

SIR,—I beg to submit herewith for your approval the twenty-fifth annual report of the work completed or in progress at the several Dominion Experimental Farms and Stations.

In addition to my own reports as Director and Acting Dominion Agriculturist, you will find also reports from the following Dominion officers of the Central Experimental Farm: The Horticulturist, Mr. W. T. Macoun; the Cerealist, Dr. C. E. Saunders; the Chemist, Mr. Frank T. Shutt; the Entomologist, Dr. C. Gordon Hewitt; the Botanist, Mr. H. T. Güssow and also from the Poultry Manager, Mr. A. G. Gilbert.

From the branch Experimental Farms and Stations, there are reports from Mr. J. A. Clark, Superintendent of the Experimental Station for Prince Edward Island at Charlottetown; from Mr. R. Robertson, Superintendent of the Experimental Farm for Nova Scotia at Nappan; from Mr. Gus. A. Langelier, Superintendent of the Experimental Station for Central Quebec at Cap Rouge; from Mr. W. C. McKillican, Superintendent of the Experimental Farm for Manitoba at Brandon; from Mr. Angus Mackay, Superintendent of the Experimental Farm for Southern Saskatchewan at Indian Head; from Mr. Wm. A. Munro, Superintendent of the Experimental Station for Central Saskatchewan at Rosthern; from Mr. R. E. Everest, Superintendent of the Experimental Station for Northwestern Saskatchewan at Scott; from Mr. W. H. Fairfield, Superintendent of the Experimental Station for Southern Alberta at Lethbridge; from Mr. G. H. Hutton, Superintendent of the Experimental Station for Central Alberta at Lacombe and from Mr. P. H. Moore, Superintendent of the Experimental Farm for British Columbia at Agassiz.

These reports will be found to contain the results obtained in many lines of experimental and investigational work being carried on by the various officers at the several Experimental Farms and Stations. As must necessarily be not infrequently the case, the record is a report of progress made or a statement of conditions presently existing, in connection with lines of work now under way.

The increasing correspondence on agricultural, horticultural and cognate subjects indicates a very general awakening among Canadian farmers to the need for reliable assistance in the many problems and difficulties which confront them in their daily work.

These demands for help are met very largely by our reports and by the various bulletins which have been and continue to be issued from time to time as opportunity offers or as the completion of particular lines of experimental work justifies.

The included reports will be found to be considerably more brief than have been those submitted by the same officers for a few years past. It is proposed to still further reduce the volume of these annual reports and to issue more of the information that has heretofore been included therein in the form of timely bulletins, or seasonal supplementary reports.

It is hoped that the information contained in the accompanying volume may be of use to the many readers it is expected to reach.

I have the honour to be, sir,
Your obedient servant,

J. H. GRISDALE,
Director, Dominion Experimental Farms.

To the Honourable
The Minister of Agriculture,
Ottawa.

ANNUAL REPORT OF THE EXPERIMENTAL FARMS

FOR THE YEAR ENDING MARCH 31, 1912

REPORT OF THE DIRECTOR

J. H. GRISDALE, B.Agr.

FIELD CROPS OF THE DOMINION.

It may prove of interest to give some brief notes on the field crops of the Dominion for the season of 1911. The data given below have been obtained from the Census and Statistics Monthly, an official organ of the Federal Department of Agriculture. The figures given for 1911 in that publication, however, are based on those obtained during the taking of the census, and thus, while presumably much more accurate than those of former years, which were obtained from the reports of correspondents in all parts of the Dominion, they are not strictly comparable with the latter from the very fact mentioned. In view of the different bases on which the total yields were estimated for the two years, the fairest comparison is obtained by studying the differences in the average yields per acre and price per bushel or ton.

The total area under field crops in Canada in 1911 was 32,853,074 acres and the total estimated value of the crops harvested thereon $565,711,600.

In the following tables will be found the average yield per acre and average price obtained for the principal field crops for the years 1910 and 1911, the total production for each year, and the average yield and price obtained in the Eastern and Western provinces respectively.

Comparison of Yields and Prices Obtained for the Years 1910 and 1911.

Crop.	Average Yield per Acre.		Average Price per Bushel.		Total Production.	
	1910.	1911.	1910.	1911.	1910.	1911.
	Bushels.	Bushels.	$	$	Bushels.	Bushels.
Fall Wheat	23.49	22.19	.870	.825	16,610,000	26,014,000
Spring Wheat	15.53	20.63	.738	.611	133,379,600	189,837,300
Oats	32.79	37.76	.354	.364	323,449,000	348,187,600
Barley	24.62	28.94	.474	.566	45,147,600	40,641,000
Rye	18.35	18.89	.702	.774	1,543,500	2,694,400
Peas	16.93	15.80	.880	1.025	6,538,100	4,536,100
Buckwheat	26.77	22.69	.563	.641	7,243,900	8,155,500
Mixed grains	33.76	29.78	.512	.607	19,433,600	16,679,000
Flax	7.97	11.41	2.07	1.507	3,802,000	12,921,000
Beans	22.21	19.06	1.78	1.920	1,177,800	1,155,600
Corn (for husking)	57.00	59.39	541	.648	18,726,000	18,772,700
Potatoes	147.14	143.82	.45	.60	74,048,000	66,023,000
Turnips, etc	402.36	373.92	.23	.23	95,207, 0)	84,933,000
	Tons.	Tons.			Tons.	Tons.
Hay and Clover	1.82	1.61	9.66	11.55	15,497,000	12,694,000
Fodder Corn	9.38	9.92	4.68	4.84	2,551,000	2,577,200
Sugar Beets	9.69	8.66	5.72	6.58	155,000	177,000
Alfalfa	.....	2.24	.....	9.868	.....	227,900

Comparison of Eastern and Western Provinces as to Yields and Prices Obtained.

Crop.	Eastern Provinces.				Western Provinces.			
	Average Yields.		Average Prices.		Average Yields.		Average Prices.	
	1910.	1911.	1910.	1911.	1910.	1911.	1910.	1911.
	Bushels.	Bushels.	$	$	Bushels.	Bushels.	$	$
Fall Wheat	25.24	20.95	.882	.872	12.59	24.99	.718	.733
Spring Wheat	19.72	17.95	1.031	1.00	15.38	20.73	.725	.607
Oats	36.17	28.88	.387	.473	28.82	46.64	.301	.281
Barley	29.06	25.8	.555	.712	21.14	31.56	.383	.465
Rye	.....	17.47	.....	.819	22.65	27.30	.595	.610
Flax	.....	13.57	.....	1.87	8.18	11.40	2.07	1.50
Potatoes	147.6	134.7	.436	.636	143.7	194.6	.586	.448
Turnips	406.1	384.2	.221	.216	273.1	299.4	.447	.355
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Hay and Clover	1.84	1.64	9.63	11.57	1.07	1.65	11.29	10.93
Fodder Corn	9.38	9.15	4.69	4.74	.....	7.71	.....	9.00
Sugar Beets	9.87	8.53	5.86	6.73	9.00	8.00	5.00	5.00
Alfalfa	.....	2.22	.....	10.81	.....	2.47	.....	.....

REPORT OF EXPERIMENTS IN THE PEACE RIVER DISTRICT.

Fort Vermilion,
Peace River, Alberta, March 31, 1912.

J. H. Grisdale, B.Agr.,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit the fourth annual report of the work on the Experimental Station at Fort Vermilion.

The month of April, 1911, opened cold and continued so until the middle of that month when a rapid thaw set in with high temperature and no night frosts. It appeared as though seeding would commence about the 26th. A heavy snow storm amounting in all to 6 inches, set in, however, and delayed seeding until May 1, after which date it became general. The first half of May was very favourable for seeding and germination, the ground being in excellent condition, with plenty of moisture. Barley was sown on May 16th, wheat being already well up by that date.

At the opening of spring, the fruit trees and shrubs all appeared to have wintered well, many being in leaf by the middle of May. Two strains of Alfalfa survived the winter as also the Brome Grass. The orchard grass winter-killed completely.

The latter part of May and the first half of June was very dry and cold, a severe frost being registered on May 22nd. Fruit trees and shrubs seemed to show more indication of winter injury than at first thought.

In some parts of the district the effects of this cold dry weather were much more marked than on the Experimental Station and in its immediate neighbourhood.

On June 16, 1911 there was a very timely rain of ¼ of an inch.

Garden vegetables were attacked severely by cutworms during June and remedies could not be obtained in time to be of value that season.

The weather during the latter part of June and first half of July was very favourable for growth, the rainfall being abundant and the weather warm.

By the 17th of the latter month the Alfalfa, Timothy and Brome Grass had been cut, the last named especially giving a very heavy crop. Haying was general by this date, the crop being light on the uplands but good on low lands and swamps. During the remainder of July and during August there was an abundance of rain which delayed haying and harvest. By the 15th of the latter month, the second crop of Alfalfa had reached a height of 18 inches. Three plots of barley, (Claude, Champion and Sidney) were cut on the 7th.

Currants were picked on the 4th and raspberries were beginning to ripen on the 15th.

By September 3, harvest was general having been delayed by the wet weather. On the 11th the wheat was still in stook on the Station, with Red Fife and Kubanka still uncut. On this date 6° of frost were recorded.

In this neighbourhood wheat was very good but farther away some damage was done by frost.

Three plots of winter wheat were sown, one on August 1st, one on August 15th and one on September 1st.

On the 14th of October, the foliage on the trees in the orchard was still green although some severe frosts had been experienced. By the 20th of the month the ground was frozen solid, no ploughing being done after that date. During the first two weeks in November the temperature reached 32° below zero several times .

Results of threshing indicate considerable damage by frosts. On my own farm the wheats were very good, except Red Fife; barley very good, oats only fair.

I have the honour to be, sir,

Your obedient servant,

(Sgd.) ROBERT JONES.

EXPERIMENTS WITH CEREALS.

These were all sown on plots of 1/30 of an acre each.

SPRING WHEAT—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw including head.	Character of Straw.	Average Length of Head.	Kind of Head.	Weight of Straw	Yield per Acre.	Weight per measured bushel after cleaning.
					In.		In.		Lbs.	Bush. Lbs.	Lbs.
1	Bishop...	May 2	Sept. 5	127	48	Medium	3	Bearded..	8,280	73 ..	61
2	Early Riga.....	" 3	" 1	121	50	"	3¼	Beardless.	8,760	71 ..	63
3	Marquis.....	" 2	" 6	123	51	"	3½	"	8,760	70 ..	61.2
4	Preston...	" 2	Aug. 31	122	48	Stiff.	3	Bearded..	6,240	63 ..	63
5	Ladoga	" 2	Sept. 1	123	50	Weak.	3	" ..	8,100	61 ..	63.5
6	Red Fife.	" 2	" 13	135	48	"	3½	Beardless.	9,240	54 ..	58
	(Durum Wheat)										
1	Kubanka	" 3	Sept. 13	135	52	"	3	Bearded..	8,160	52 ..	59

Oats—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw including head.	Character of Straw.	Average Length of Head.	Weight of Straw	Yield per Acre.		Weight per measured bushel after cleaning.
					In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Banner	May 3	Aug. 25	115	54	Weak.	9	7,860	115	20	40
2	Improved Ligowo	" 3	" 17	107	52	Stiff.	9	7,610	112	2	42½
3	Tartar King	" 3	" 15	105	48	"	8	6,750	108	18	40
4	Excelsior	" 3	" 16	106	50	Medium	7	6,000	106	26	39

Six-Row Barley—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head	Character of Straw.	Average Length of Head.	Weight of Straw.	Yield per Acre.		Weight per measured bushel after cleaning.
					In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Mensury	May 4	Aug. 5	104	44	Weak	3	5,400	79	18	51
2	Claude	" 5	" 7	95	49	Strong	4	5,970	71	42	46
3	Champion	" 5	" 7	95	52	Medium	3¾	7,620	55	30	39½

Two-Row Barley—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Character of Straw.	Average Length of Head.	Weight of Straw.	Yield per Acre.		Weight per measured bushel after cleaning.
					In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Sidney	May 4	Aug. 25	114	53	Medium	3¾	6,930	77	24	52
2	Canadian Thorpe	" 4	" 15	104	40	Strong	2¾	5,250	48	6	51½

Peas—Test of Varieties.

Number.	Name of Variety.	Size of Pea.	Date of Sowing.	Date of Ripening.	Number of days Maturing.	Average Length of Straw.	Average Length of Pod.	Yield of Grain per Acre.		Weight per measured bushel after cleaning.
						inches	inches	Bush.	Lbs.	Lbs.
1	Arthur	Medium	May 4	Aug. 29	117	55	2½	45	..	665

FIELD ROOTS.

On May 13, a 1/50 acre plot of each of the following roots was sown:—

Turnips.—Good Luck, Perfection Swede.

Mangels.—Mammoth Long Red, Giant Yellow Intermediate.

Sugar Beets.—Vilmorin's Improved, Klein Wanzleben.

Carrots.—Improved Short White, Half-Long Chantenay.

These plots, unfortunately, were completely destroyed by cutworms and no further supply of seed could be secured in time for a second sowing to be made.

POTATOES.

Carman No. 1.—Planted May 4 in nine (9) drills, 33 feet long. Amount of seed used 130 lbs.; yield 606 lbs.

Gold Coin.—Planted May 4 in seven (7) drills, 33 feet long. Amount of seed used 24 lbs.; yield 471 lbs.

Irish Cobbler.—Planted May 4 in 3 drills, 33 feet long. Amount of seed used 12 lbs.; yield 105 lbs.

Early Rose.—Planted May 5. Dug September 16. Yield 647 bushels per acre.

The potato crop was very good all through this district.

GRASSES AND CLOVERS.

Orchard Grass.—This was completely winter-killed.

Alfalfa.—Very strong growth. Two cuttings were made, the first yielding 2 tons, 1,250 lbs. per acre, and the second 1 ton, 100 lbs.

Brome Grass.—A heavy crop.

Sainfoin.—A heavy crop.

Timothy.—A heavy crop.

Canary Grass.—Sown May 4. Cut August 15. Yield 2 tons, 1,460 lbs. per acre.

The yield of hay in the Fort Vermilion district was generally good on the more low-lying lands.

VEGETABLES.

All of the vegetables suffered more or less from the cutworms, but what was left grew to a large size.

Asparagus.—In use from May 29 until well into August. That used this year was from an old bed of Conover's Colossal. Plants to the number of 80, from seed sown in 1909, were transplanted on May 30. On August 17, 105 plants were replanted from old beds in readiness for next spring.

Beans.—Varieties tested: Dwarf Black Wax, Dwarf Golden Wax, Improved Golden Wax, Challenge Black Wax. These were in use from the first week in August.

Celery.—Sown in hotbed, April 22. Transplanted May 31. White Plume Paris, in use August 10. Rose Ribbed Paris, in use August 14. Weight of one dozen of the former, 10 lbs., and of the latter, 9 lbs.

Garden Peas.—Varieties tested: Triumph, in use July 31, ripe August 25. Stratagem, in use August 5, ripe September 4. Gradus, in use July 20, ripe August 24. Admiral Dewey, in use July 27, ripe August 30. Witham Wonder, in use July 22, ripe August 22. Gregory's Surprise, in use July 19, ripe August 12. Premium Gem in use July 29, ripe August 19. American Wonder, in use August 1, ripe August 23. These were all sown on May 5.

Table Beets.—These were sown on May 9 and were pulled on September 19. Varieties tested: Early Blood Red Turnip, in use July 20; Flat Extra Early, in use July 25; Egyptian Extra Early, in use July 29; Nutting's Dwarf Red, in use August 2.

Table Carrots.—Early French Horn, in use July 15; Amsterdam Scarlet, in use July 29.

Lettuce.—Sown in open, May 10. The following varieties were tested and all were found of good quality: Cos Trianon, in use June 12; Wheeler's Tom Thumb, in use June 10; Unrivalled Summer, in use June 6; Red Edged Victoria, in use June 18.

Radish.—Sown in open, May 10. Early Scarlet White-tipped Turnip, in use June 8; Winter Black Spanish, in use June 13, and were good all summer; Foreing Turnip Scarlet, in use June 12.

Rhubarb.—The old bed of Victoria was in use from June 6 to September 1. One packet of seed of Victoria rhubarb was sown in the hotbed the latter part of April and the young plants were moved to the open on May 26, furnishing a supply of vigorous young plants.

Parsnips.—Hollow Crown, sown on May 9 and dug September 20; of very large size, yielding 110 lbs. from one packet of seed.

Cabbage.—Sown in hotbeds April 22, and transplanted May 17. Were replanted four or five times on account of cutworms.

Varieties tested.—Early Paris Market, in use July 1; Fottler's Improved Brunswick, in use July 6; Early Jersey Wakefield, in use June 30; Savoy Extra Early, in use June 26. The weight of these was from 6 to 9 lbs. each.

Cauliflower.—Early Paris or Nonpareil, in use July 12; average weight, 6 lbs. Earliest Erfurt, in use July 18; average weight, 7 lbs.

Tomatoes.—Sparks' Earliana, Central Experimental Farm strain. These were sown in the hotbed on April 22 and were transplanted to the open on May 29. Of 106 plants set out all but 25 were destroyed by cutworms. From the 25 plants, about two bushels of partly ripe fruit was gathered.

Squash.—Planted May 8. A hole three feet deep was dug for each hill. This was filled with manure and a box without a bottom put in. Three seeds were then planted to each hill and a glass put over the top. When the plants were large and strong enough, the box and glass was removed without disturbing the plants. Good success was obtained in this way.

Varieties tested.—Summer Golden Crookneck, average weight, 5¾ lbs.; Hubbard, average 9½ lbs.; White Bush Scalloped, 2 lbs.; Mammoth Whale, 17 lbs.; White Congo, 11½ lbs.

Cucumber, treated in the same way. White Spine, average weight, ¾ lb.

Onions.—Varieties tested: Large Red Wethersfield, Danvers' Yellow Globe, Paris Silverskin.

Owing to the early part of the summer being so dry, the onions were all very small.

Table Corn.—Early Malakoff: in tassel, August 2; in silk, August 26; stalks 3 to 3½ feet high. No kernels were formed, as the corn was killed by frost on September 3.

Brussels Sprouts, Brocoli and Table Turnips were all destroyed by cutworms.

FRUITS.

The following varieties of cross-bred apple trees have done well during the season; only one, the Robin, fruited: Alberta, Charles, Tony, Prince, Golden, Magnus, Silvia, Robin, Pioneer, seedlings of Alberta, Golden and Silvia, and the Russian apple seedlings Varna, Charlamoff and Morden.

Of plums, Cheney and Aitkin were the only varieties which withstood the severe winter of 1910-11. These did well during the season of 1911.

Currants.—The following varieties of black currants did well and fruited: Eagle, Ontario, Bang-up, Magnus, Norton, Ethel, Eclipse, Topsy, Climax, Kerry, Saunders. Of red currants, the following fruited: Simcoe King, Rankin's Red, Cumberland, Red Dutch, Long Bunch Holland, Large Red and Greenfield. Of white currants, the following fruited: Large White, White Cherry, White Raisin, White Dutch, White Grape.

Of the two varieties of raspberries tested, Hubert and Heebner, the former did fairly well. The latter was late in blooming, and most of the fruit was destroyed by frost.

ORNAMENTAL TREES AND SHRUBS.

The following varieties of trees and shrubs did well, though many were cut back considerably by the severe winter of 1910-11:—

Acer Ginnala.
Acer dasycarpum.
Acer Negundo.
Acer tataricum.
Acer pictum.
Abies remonti.
Amelanchier vulgaris.
Betula alba laciniata.
Berberis Thunbergii.
Berberis sinensis.
Clematis montana.
Caragana arborescens.
Caragana grandiflora.
Caragana frutescens.
Caragana pygmaea.
Cotoneaster tomentosa.
Crateagus Arnoldiana.
Celtis occidentalis.
Crataegus Carrieri.
Ceanothus Americanus.
Lonicera alpina.
Lonicera Fenzlei.
Lonicera tatarica virginalis alba.
Lonicera Sullivanti.
Diervilla lutea.
Euonymus europaeus ovatus.
Euonymus linearis.
Hydrangea paniculata grandiflora.
Ligustrum amurense.
Green Ash.
Populus angustifolia.
Lycium europaeum.
Philadelphus Mont Blanc.
Douglas Spruce.
Pinus sylvestris.
Spiraea Billardi.
Picea pungens.
Pinus Strobus.
Quercus rubra.
Rhamnus frangula.
Ribes aureum.
Retinospora pisifera.
Spiraea sorbifolia
Russian Olive.
White Birch.
Spiraea arguta.
Willow Voronesh.
Thuya occidentalis.
Thuya occid. globosa.
Thuya occid. Columbia.
Thuya occid. Hoveyi.
Viburnum molle.
Juneberry.
Roses—
Persian Yellow.
Delicata.
Alberta.
Syringa (Lilac).
" *amurensis.*
" *Japonica.*
" *Pekinensis.*
" *Villosa.*
" v. Madame Casimir Perrier.
" " Chas. Joly.
" " Charles X.
" " Michel Buchner.
" " Emile Lemoine.
" " Jacques Calot.
" Congo.
" v. Mlle. Fernande Viger.
" " Mme. Abel Chatenay.
" " Souvenir de Ludwig Spath.

Flower Garden.

Variety.	Sown in open.	In bloom from.	Remarks.
Stocks, Ten Weeks	May 10	August 1	Fine Bloom.
Godetia	" 10	July 4	
Alyssum	" 10	" 4	
Mignonette	" 10	" 1	
Verbena	" 10	" 20	
Pansy	" 10	June 20	Plants from 1910 in bloom early in May.
Portulaca	" 10	July 29	
Aster, Semple's Branch'g	" 10	August 12	Very fine and large.
Giant Comet	" 10	Sept. 2	
Victoria Mixed	" 10	Aug. 30	
Clarkia elegans	" 10	July 22	Very good.
Sweet Peas	" 11	" 1	Very large.
Balsam, camellia	" 12	" 26	Good.
Celosia	" 12	August 4	
Marigold	" 12	July 30	
Scabiosa	" 12	July 22	Good.
Dianthus chinensis	" 12	June 28	Very fine.
Phlox	" 12	July 26	Very fine indeed.
Lobelia	" 12	" 20	
Nasturtium	" 12	" 1	
Primula	" 15	" 24	Very fine.
Zinnia	" 15	August 1	
Nigella	" 15	July 21	
Morning Glory	" 15	August 19	
Calliopsis	" 10	July 19	Good.
Candytuft	" 13	June 29	Bloomed freely.
Centaurea	" 15	July 28	
Brachycome	" 15	" 15	Very good.
Chrysanthemum	" 15	" 6	Bloomed freely.
Poppy Snowdrift	" 13	August 3	Very good.
" Iceland	" 13	July 3	
" Double annual	" 13	" 4	
" Shirley	" 13	" 3	In bloom till frost.
" California	" 15	June 29	Very pretty.
Helianthus	" 15	July 27	
Delphinium	Plants from 1910 Set out	" 30	In bloom till Oct.
Antirrhinum	May 30	" 31	Start in hot bed, May 1.
Salpiglossis	May 16	August 7	

TABLE of Meteorological Observations taken at Fort Vermilion, Peace River District, Alberta, from April 1, 1911, to March 31, 1912, showing maximum, minimum, and mean temperature, the highest and lowest for each month with date of occurrence; also, rainfall, snowfall, and total precipitation.

MONTH.	Maximum.	Minimum.	Range.	Mean.	Highest.	Date.	Lowest.	Date.	Rainfall.	Snowfall.	Total precipitation.	Number of days precipitation.	Heaviest in 24 hours.	Date.
	°	°	°	°	°		°							
April	40·23	11·11	29·12	25·67	69·0	22nd. ..	—26·0	4th.....	0·78	6·00	1·38	3	0·64	25th.
May	63·23	33·92	29·31	48·57	82·2	17th. ...	19·0	23rd. ...	0·41	.....	0·41	3	0·36	6th.
June	68·15	40·98	27·17	54·56	87·0	13th.. ..	29·0	4th.....	2·70	.....	2·70	9	1·43	19th.
July	73·23	44·97	28·26	59·10	90·3	25th.. ..	32·2	20th....	1·62	.....	1·62	8	0·79	3rd.
August	66·99	39·88	27·10	53·43	77·5	1st.....	31·5	8th, 31st	1·85	.....	1·85	8	1·24	11th.
September	58·23	28·86	29·36	43·54	76·0	16th.. ..	8·0	23rd....	1·32	.....	1·32	7	0·35	14th.
October	49·50	23·37	26·12	36·43	76·9	9th... ..	—3·5	31st	0.19	.....	0·19	3	0·09	16th.
November	21·16	—11·66	32·82	4·75	53·0	3rd.....	—33·5	15th....	... ..	4·00	0·40	3	0·20	20th.
December	10·83	—14·56	25·40	—1·86	35·5	16th.....	—58·5	28th	.....	3·00	0·30	1	0·30	23rd.
January	0·06	—23·15	23·22	—11·54	26·9	26th.....	—58·0	5th.....	.....	2·00	0·20	4	0·07	7th.
February	15·35	—12·22	27·57	1·56	35·0	23rd.. ..	—48·0	28th....	.....	3·25	0·32	6	0·10	14th.
March	30·09	—8·94	39·03	10.57	54·5	26th.....	—38·0	1st.	.....	0·50	0·05	2	0·02	24th.
									8·87	18·75	10·74	57		

Some Weather Observations taken at Central Experimental Farm, Ottawa, as compared with those taken at Fort Vermilion, Peace River District, Alberta.

April.

	Mean Temperature.	Highest Temperature.	Lowest Temperature.	Total Precipitation.	Heaviest in 24 hours.	Total hours Sunshine.	Average Sunshine per day.
	°	°	°				
Ottawa	39·44	81·2	3·6	1·47	0·60	257·4	8·58
Fort Vermilion	25·67	69.0	−26·0	1·38	0·64	175·3	5·84

May.

Ottawa	62·98	93·9	24·0	2 80	0·97	279·8	9·02
Fort Vermilion	48·57	82·2	19·0	0·41	0·36	233·9	7·54

June.

Ottawa	64·62	88·0	45·4	3·64	1·48	233·1	7·77
Fort Vermilion	54·56	87·0	29·0	2·70	1·43	217·6	7·25

July.

Ottawa	71·46	97·8	48·0	2·79	1·08	326·7	10·53
Fort Vermilion	59·10	90·3	32·2	1·62	0·79	264·0	8·51

August.

Ottawa	70·31	97·6	42·6	1·47	0·64	278·7	8·99
Fort Vermilion	53·43	77·5	31·5	1·85	1·24	214·1	6·90

September.

Ottawa	56.90	80·8	28·8	2·98	0·93	210·1	7·00
Fort Vermilion	43·54	76·0	8·0	1·32	0·35	165·7	5·52

October.

Ottawa	47·17	72·0	23·6	2·13	0·93	152·1	4·90
Fort Vermilion	36·43	76·9	−3·5	0·19	0·09	141·2	4.55

November.

Ottawa	30·43	60·0	5·8	2·93	0.58	81·0	2·70
Fort Vermilion	4·75	53·0	−33·5	0·40	0·20	88·2	2·94

December.

Ottawa	26·24	51·6	− 3·6	2·68	0·70	72·3	2·33
Fort Vermilion	−1·86	35·5	−58·5	0·30	0·30	53·2	1·71

SOME Weather Observations taken at Central Experimental Farm, Ottawa, as compared with those at Fort Vermilion, Peace River District, Alberta—*Con.*

JANUARY.

	Mean Temperature.	Highest Temperature.	Lowest Temperature.	Total Precipitation.	Heaviest in 24 hours.	Total Sunshine.	Average Sunshine per day.
	°	°	°				
Ottawa	2·24	36·4	—26·2	2·60	0·95	119·1	3·84
Fort Vermilion	—11·54	26·9	—58·0	0·20	0·07	51·4	1·65

FEBRUARY.

Ottawa	12·04	35·4	—24.0	3·04	1·30	141 2	4·86
Fort Vermilion	1.56	35·0	—48·0	0·32	0·10	88·3	3·04

MARCH.

Ottawa	19·34	44·0	—17·0	1·42	0·75	211·0	6·80
Fort Vermilion	10·57	54·5	—38·0	0·65	0·02	197·7	6·37

RECORD of Sunshine at Fort Vermilion, Peace River District, Alberta, from April 1, 1911, to March 31, 1912.

Month.	Number of days with sunshine.	Number of days without sunshine.	Total hours sunshine.	Average sunshine per day.
April	27	3	175·3	5·84
May	28	3	233·9	7·54
June	27	3	217·6	7·25
July	30	1	264·0	8·51
August	28	3	214·1	6·90
September	27	3	165·7	5·52
October	23	3	141·2	4·55
November	21	9	88·2	2·94
December	16	15	53·2	1·71
January	17	14	51·4	1·65
February	17	12	88·3	3·04
March	30	1	197·7	6·37

(Signed) WILLIAM T. ELLIS,
Observer.

NOTE.—The records for Fort Vermilion are taken by Mr. Jones, of the Experimental Station there, and the tables therefrom are prepared by Mr. Wm. Ellis, Weather Observer, Central Farm.

METEOROLOGICAL OBSERVATIONS.

TABLE of Meteorological Observations taken at the Central Experimental Farm, Ottawa, from April 1, 1911, to March 31, 1912, giving maximum, minimum, and mean temperature for each month with date of occurrence; also, the rainfall, snowfall and total precipitation.

Month.	Maximum.	Minimum.	Range.	Mean.	Highest.	Date.	Lowest.	Date.	Rainfall.	Snowfall.	Total Precipitation.	Number of Days of Precipitation.	Heaviest in 24 Hours.	Date.
	°	°	°	°	°		°							
April	50·29	28·59	21·70	39·44	81·2	29th....	3·6	4th....	1·07	4·00	1·47	8	0·60	5th.
May	76·14	49·82	26·32	62·98	93·9	22nd ...	24·0	4th....	2·80	.....	2·80	10	0·97	24th.
June	74·75	54·50	20·24	64·62	88·0	27th....	45·4	24th...	3·64	.....	3·64	15	1·48	12th.
July	84·02	58·91	25·10	71·46	97·8	3rd....	48·0	27th....	2·79	.....	2·79	14	1·08	2nd.
August	82·73	57·90	24·83	70·31	97·6	1st....	42·6	30th....	1·47	.....	1·47	11	0 64	27th·
September	67·57	46·24	21·33	56·90	80·8	1st....	28·8	14th....	2·98	.....	2·98	16	0·93	15th.
October	56·46	37·88	18·58	47·14	72·0	4th....	23·6	28th....	2·13	S	2·13	11	0·93	4th.
November	37·13	23·51	13·85	30·43	60·0	12th....	5·8	17th....	1·73	12·00	2·93	16	0·58	24th.
December	31·84	20·65	11·19	26·24	51·6	11th....	—3·6	20th....	1·31	13·75	2·68	13	0·70	15th.
January	10·71	-6·23	16·95	2·24	36·4	19th....	—26·2	13th....	0·11	25·00	2·60	16	0·95	9th.
February	20·98	3·11	17·87	12·04	35·4	17 & 18th	—24·0	10th....	0·07	29·75	3·04	8	1·30	22nd.
March	29·99	8·70	21·29	19·34	44·0	29th....	—17·0	6th....	0·02	14·00	1·42	11	0·75	15th.
									20·12	98·50	29·95	149		.

Rain or snow fell on 149 days during the 12 months.

Heaviest rainfall in 24 hours, 1·48 inches on June 12.

Heaviest snowfall in 24 hours, 13·00 inches on February 22.

The highest temperature during the 12 months was 97°·8 on July 3.

The lowest temperature during the 12 months was − 26·2° on January 13.

During the growing season rain fell on 8 days in April, 10 days in May, 15 days in June, 14 days in July, 11 days in August, and 16 days in September.

April and February show the lowest numbers of days with precipitation, viz., 8 each.

Total precipitation during the 12 months 29·95 inches, as compared with 27·71 inches during 1910-11.

RAINFALL, Snowfall and Total Precipitation from 1890 to 1911-12, also the average annual amount that has fallen.

Year.	Rainfall.	Snowfall.	Total Precipitation.
1890	24·73	64·85	31·22
1891	30·19	73·50	37·54
1892	23·78	105·00	34·28
1893	31·79	72·50	39·04
1894	23·05	71·50	30·20
1895	27·01	87·50	35·76
1896	21·53	99·75	31·50
1897	24·18	89·00	33·08
1898	24·75	112·25	35.97
1899	33·86	77·25	41·63
1900	29·48	108·00	40·72
1901	29·21	97·25	38·91
1902	25·94	101·75	36·10
1103	26·43	85·00	34·92
9904	25·95	108·75	36·79
1905	23·71	87·25	32·42
1906 January 1 to March 31	1·90	24·50	4·34
1906–07	21·73	72·50	28·94
1907–08	24·70	134·75	38·18
1908–09	22·13	107·90	32·91
1909–10	28·40	61·25	34·51
1910–11	18·94	88·25	27·72
1911–12	20·12	98·50	29·95
Total for 22 years and 3 months	563·51	2,028·75	766·63
Average for 22 years	25·61	92·21	34·84

RECORD of Sunshine at the Central Experimental Farm, Ottawa, from April 1, 1911, to March 31, 1912.

Months.	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine.	Average Sunshine per day.
April	29	1	257·4	8·58
May	30	1	279·8	9·02
June	26	4	233·1	7·77
July	30	1	326·7	10·53
August	31	0	278·7	8·99
September	25	5	210·1	7·00
October	25	6	152.1	4 90
November	21	9	81·0	2·70
December	17	14	72·3	2·33
January	23	8	119·1	3·84
February	26	3	141·2	4·86
March	29	2	211·0	6·80

(Signed), WILLIAM T. ELLIS,
Observer.

REPORT OF EXPERIMENTS ON THE FRUIT FARM OF THOS. A. SHARPE, SALMON ARM, B.C.

SALMON ARM, March 31, 1912.

The Director,
Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit this, my first report on the experimental work done on this farm.

The clearing of the land was begun in the spring of 1905 and has been carried on slowly until the present time. I have now about 30 acres under cultivation.

Most of the land in this locality had been burned over some years ago, and a young growth of birch, fir and spruce has since grown up, but the soil is lacking in humus, the surface having been burned off, and I am trying to remedy this condition by sowing clover and adopting a short rotation.

Owing to the fact that the rainfall here is usually light, a plentiful supply of vegetable matter is necessary in the soil to ensure a vigorous growth of fruit trees or in fact of any crop and, as clover and alfalfa do very well in this locality, even on new land, it will be a comparatively easy task to put the land in first-class condition to grow fruit trees.

The first five acres cleared was sown with 15 lbs. per acre of red clover in the spring of 1907 and turned under in the same year. The land was got ready for fruit trees, and quite a collection of desirable varieties were planted in the spring of 1908. Owing to my inability to spend more than a day or two on the farm each summer, and as the men I employed were not fruit-growers, the orchard planted in the spring of 1908 did not make as much progress as could have been attained with greater care, but most of the trees have made a fair, healthy growth. The following varieties fruited this year: Brewington Pippin, Burlington, Green Newtown Pippin, Higby

Sweet, Baxter, Jonathan, Longfield, Magnet, Major, Jewett's Best, McIntosh Red, Norton's Melon, Newtown Spitzenburg and Standard. Several of these are new to this district and more time is required to form an opinion as to their merits but the following are promising: Jewett's Best, Magnet, Baxter and Longfield.

The following is a list of the varieties of apples planted in the spring of 1908, most of which had been tested on the Experimental Farm at Agassiz and were selected because of probable value in this district: Ailes, Baltimore, Baxter, Beauty of Bath, Bethlemite, Boyd, Brewington Pippin, Burlington, Canada Red, Cannon Pearmain, Cox Orange Pippin, Cranberry Pippin, Cullasaga, Ferris, Green Newtown Pippin, Grimes' Golden, Higby Sweet, Ira, Jersey Sweet, Jewett's Best, Jonathan, Julian, Magnet, Major, McIntosh Red, McLellan, Minister, Mother, Newtown Spitzenburg, Norton's Melon, Orenco, Longfield, Lady Sweet, Picket, Piedmont, Pippin, Porter, Shiawassee Beauty, Swayzie Pomme Gris, Scarlet Pippin, Stanard, Spitzenburg, White Pippin, White Winter Pearmain, Winter Banana, Yellow Newtown Pippin—forty-six varieties in all. In addition, forty-one varieties were planted in the spring of 1911, most of which have made a satisfactory growth.

PEARS.

In the experimental pear orchard there are thirty-four varieties planted and doing well. A few trees planted in the spring of 1908 have all done well, and the Dr. Jules Guyot bore a few specimens of fruit in 1911. This variety is quite promising for this district.

There are also a number of varieties in the nursery, to be planted the coming season.

CHERRIES.

Three varieties of cherries were planted in the spring of 1908, and these fruited in 1910 and bore a fine crop in 1911. The varieties are: Olivet, de Planchoury, and Von der Natte. Several additional varieties have been ordered for planting this spring.

PLUMS.

Three varieties of plums have been planted in an orchard and several sorts are in the nursery. Several varieties have been ordered for this season's planting.

BERRIES.

Three varieties of blackberries were planted in the spring of 1908, namely: Eldorado, Snyder, and Stone's Hardy. All of these have fruited, and stand the climate. The Eldorado is the most productive and bears the finest fruit.

METEOROLOGICAL RECORDS.

As the instruments were not all received at the same time, the record of sunshine commences May 13, and that for temperature and precipitation on July 1.

Month.	Highest Temperature Degrees.		Lowest Temperature Degrees.		Rainfall.	Snowfall.	Sunshine.
1911.	Date.	Temp.	Date.	Temp.	In.	In.	Hrs. Min.
April							
May 13th to 31st							151-36
June							296-12
July	16 & 25	96½	12th	43	1·84		319-00
August	18th	89	28th	41	1·14		265-00
September	1 & 2	85	25th	26	1·20		149-12
October	7th	76	28th	19	·1		164-42
November	4th	47	12th	1	1·95	20·5	61-42
December	1st	40	31st	—5	1·5	23·5	30-12
1912.							
January	25th	46	2nd	—15	1·86	9·0	43-42
February	14 & 19	44	29th	2	·47	3·0	67-42
March	13th	62	3rd	3	·22		229-00
					9·99	56·0	1,808-00

Taking ten inches of snow as equivalent to one inch of rainfall, the total precipitation for the period during which a record was kept was 15·59 inches.

I have the honour to be, sir,
Your obedient servant,

THOS. A. SHARPE,

EXPERIMENTS IN HORTICULTURE AT ATHABASKA LANDING.

Arrangements were made this season with Archdeacon Robins of Athabaska Landing to carry on some experiments in horticulture for the Department, at his home at that point. Following will be found his report on the season's results.

The work will be continued there during the coming season.

ATHABASKA LANDING, ALBERTA, March 31, 1912.

The DIRECTOR,
Dominion Experimental Farms,
Ottawa, Ontario.

SIR,—I have the honour to report as follows on the experiments in horticulture conducted at Athabaska Landing during the year 1911-12.

GENERAL REMARKS.

Snow disappeared during the first ten days of April. A long spell of cold weather followed, the sun was hot but cold nights kept the frost in the ground to such an extent that ploughing and digging were not possible until the latter end of the month.

May was a month satisfactory for garden work, also the early part of June; then followed one of the wettest summers on record.

TREES AND SHRUBS.

These suffered badly in transit. The packing of them was satisfactory, but the delay in procuring them from Edmonton was so long and the season so frosty that when they were delivered on May 25, all were badly frozen and appeared to be dead.

The ground had been carefully prepared and all were treated with regard, but a dry spell of a few weeks followed by the maintained wet weather to which reference has been made, seemed to make recovery impossible for the majority. Constant care was bestowed on them all, the apparently dead as well as those showing signs of vitality, but the bush fruits exhibited no response, while the plums were very languid and only a few apples maintained evidence of life until the end of the season.

My conclusion was that none of them had a fair trial for the reasons above stated, and some may yet prove living and encouraging.

Every tree and shrub received careful marking as to location, thus affording opportunity for observation in the opening season.

Plans indicating the arrangement accompany this report.

Amongst apples, Yellow Transparent gave the strongest sign of life, and of the shrubs the Syringas and Ampelopsis.

I am of the opinion that no final conclusions can be drawn from the tests of one short season, especially such as that experienced. I purpose taking advantage of every indication of promising character in this next spring and summer.

FLOWERS.

I had no means of forcing the less hardy sorts, and the weather conditions demanded this. The results were not discouraging if this be kept in mind.

Poppy (Shirley), flowered freely on a southern border.

Mignonette in a similar situation did fairly.

Verbena (sown in open border), flowered well.

Sweet Peas grew moderately, but scarcely flowered at all.

Asters and Pansies had not time to produce flowers but were promising well.

A sharp frost of about ten degress in the third week of August arrested many promising signs and made recovery for some plants impossible.

My conclusions with flowers were that with glass to assist the more tender sorts, which could be planted out about the end of May, together with the hardy annuals sown direct in their flowering quarters, no difficulty of serious consideration would be experienced.

VEGETABLES.

These form the most important part of human requirements in this Northland, so far as the garden is concerned. I was greatly encouraged with almost everything I tested; some of them grew abnormally.

The seeds were not put in new freshly-broken ground, but in a fine open soil, probably part of the old bed of the river Athabaska. Hoeing and weeding were diligently attended to, but no artificial watering or chemical manuring was done. A light dressing of stable manure was applied when the ground was prepared after the frost left it, but not of as short and mellowed a sort as I should have used had it been obtainable.

Radishes and turnips grew marvellously. The cutworm and turnip fly gave great trouble in the neighbourhood, but I had no serious difficulty excepting when cabbages were maturing, when cutworms began to appear.

Corn (Early Malakoff) did well until the beard began to show, when the early frost to which I have referred, stopped all its growth.

Peas (English Wonder and American Wonder) yielded equally and moderately, Cleveland's First and Best did well, while Large Pod Alaska gave splendid results. McLean's Advancer was moderate.

Beans.—Both Challenge Black Wax and Stringless Green Pod were promising abundantly, the small beans hanging in large profusion, when the sharp August frost cut them down.

Beets did exceedingly well, the Early Blood Red Turnip being more useful for kitchen use than the Egyptian Dark Red Flat.

Onion.—Large Red Wethersfield and Danvers' Yellow Globe did well in germinating, were excellent in the spring, but did not grow to any appreciable size, and failed to keep well. Probably onions will respond better if planted in small sets, these having been kept from former years.

Carrots.—French Horn grew better than Half Long Chantenay, but both gave a satisfactory yield.

Rhubarb.—Seed Victoria grew to about three small leaves which I shall watch in coming season. I sowed the seed in permanent position.

Lettuce.—All four varieties did wonderfully, the Grand Rapids being rather less satisfactory. Wheeler's Tom Thumb took a fresh lease of life after the frost, and went on producing until the severity of winter cut them.

Celery.—This failed from want of early facilities. To test the possibility, I sowed direct into the row, and obtained abundance of small plants.

I think there need be no hesitation as to maturing a crop if the seed be brought on indoors.

Cauliflower.—Extra Selected Early Erfurt Dwarf; this failed after the seed had germinated moderately.

Cabbage.—Grew freely and produced good results in abundance. The cutworm gave trouble, but not until the heads were ripe or mostly so.

Cucumber.—Evidently from the attempts the seed sown in the open made, these may be produced by use of glass.

Tomato.—Flowered and fruited freely in open until fruit was about one inch in diameter, when the frost destroyed them.

Squash.—The seeds were put in rows, on the same large heap of rotting manure covered with several inches of mellow soil. They grew so vigorously that it become impossible to tell one sort from another. All seemed to flourish and produced quantities of squash until the frost occurred. There had not been time for any to attain large growth, but they were delicious as a vegetable.

I used some other seeds besides those supplied from the Dominion Farm, such as Spinach (Sutton's Round) with results quite favourable.

Potatoes from local supplies, un-named, were planted rather too close for the wet weather, but were not disappointing.

GENERAL CONCLUSIONS.

With a more normal year and the use of glass for forcing half-hardy seeds, I anticipate excellent results with all seeds of vegetables such as are commonly used for household purposes.

As it was I provided some of the vegetables exhibited in Edmonton from this place, the exhibit obtaining the first prize.

The same remarks may be made of flowers in their future possibilities. I do not think it at all unlikely that dwarf fruit trees, apple, plum, and pear, of hardy type, will mature in the course of time. Bush fruits, currants, gooseberries and raspberries will, I think, do splendidly.

Suitable time for sowing.—May 15 to May 20.

Winter storing crops were lifted at end of September.

ARRANGEMENT OF APPLE AND OTHER TREES.

SOUTH.

Apples:	Wealthy. *	Wealthy. *	Antonovka. *	No. 1 from Russia. *	No. 1 from Russia. *
	† Gooseberry. † Lorne. †	† Greenfield's. † Red Currant. †	† Red Dutch. † Currant. †		† Victoria. † Black Currant. †
Apples:	Mecca. *	Mecca. *	Rideau. *	Fairfield. *	Fairfield. *
	† Gooseberry. † Smith's. † Improved.	† Victoria. † Red. † Currant.	† Rankin's. † Red. † Currant.		† Saunder's. † Black. † Currant.
Apples:	Samson. *	Samson. *	Robin. *	Lisgar. *	Lisgar. *
	† Gooseberry. † Houghton & † Broom.	† Gooseberry. † Ruth. †	† Large. † White. † Currant.		† Magnus. † Black. † Currant.
Plums:	Prunus. *	Tomentosa. *	Plum. *	*	*
	† Gooseberry. † Greenfield. †	† Gooseberry. † 10-48. † Seeding.	† White. † Grape. † Currant.		† Collins. † Prolific. † Black Currant.
Plums:	Carstersen's Early. *	Plum. *	Prunus. *	Tomentosa. *	Carstersen's Early. *

EAST. WEST.

NORTH.

I have the honour to be, sir,
Your obedient servant,
(Sgd.) E. F. ROBINS.

EXPERIMENTAL WORK AT KAMLOOPS, B.C.

The winter of 1910-11 and the spring following were remarkable, even in this very dry district, for the almost complete lack of precipitation. As a result, the land was so dry when the time for spring seeding arrived that it was considered useless to sow spring grains.

In the fall of 1910, the land was ploughed and left in good shape to absorb snow water during the spring of 1911, when it was cultivated as soon as dry enough, the work being continued until a complete dust blanket had been formed. This was repeated during the summer, especially after any rain heavy enough to form a crust.

On August 29 and 30, four acres were seeded with Kharkov wheat, at the rate of two bushels per acre. This came up well, and although early frosts did not allow it to make a great deal of growth in the fall, it went into the winter of 1911-12 looking healthy, and at the time of writing, March 31, 1912, it appears to have wintered well.

Of the thirty-one varieties of apple trees planted in 1910, some have proved unsuitable to the Kamloops district and will be replaced by other sorts. The remainder have, so far, done fairly well.

Mr. E. W. Calhoun, under whose supervision the experiments at Kamloops have been carried on, having resigned his position as superintendent of the Harper ranch at that point, the work will be carried on by his successor in the latter position, Mr. Lionel F. Stobart.

EXPERIMENTS AT FORTS SMITH, RESOLUTION AND PROVIDENCE.

These are Hudson's Bay Company posts, the first being situated on Slave River, about half-way between Lake Athabaska and Great Slave Lake. Fort Resolution is on the south shore of Great Slave Lake, and Fort Providence lies a short distance to the northwest of the western end of that lake, on the Mackenzie River.

A Mission for the Indians of the surrounding district is located at each fort, and the fathers in charge attempted, during the season of 1911, to test some varieties of cereals and vegetables sent them by the Department of Agriculture.

At Fort Smith, the season was very cold and backward, frost occurring on July 24. August also was very wet and cold during the whole month.

At Fort Resolution, lack of moisture during the growing season affected all crops, and the same conditions obtained at Fort Providence.

Many of the seeds sent did not germinate at any of these points, and of those which did, most did not mature or gave very light crops. It has been decided to discontinue the experimental work for the present in the above localities.

BEAVER LODGE, GRANDE PRAIRIE, ALBERTA.

Arrangements have been made with Mr. S. J. Webb, of Beaver Lodge, Grande Prairie, Alberta, to carry on some experimental work for the Department, on his farm at that point. Records of temperatures will also be kept.

GROUARD, ALBERTA

Similar arrangements have been made with the Rev. Father Laurent, who has charge of the Mission at Grouard, on the Lesser Slave Lake.

NEW EXPERIMENTAL STATIONS.

STE. ANNE DE LA POCATIERE, QUE.

Work on the Experimental Station at this place was of a preparatory rather than of an experimental character during the past season. Mr. Georges Hudon, dit Beaulieu, was appointed foreman in charge of farming operations. The crops grown and methods followed were practically the same as in former years on these farms. The only work carried on that might be considered of an experimental or demonstrational character was the growing of a few acres of Indian corn. This was highly successful, a good yield of excellent forage being secured off a moderately well-manured field, given fair treatment as to cultivation and care.

Preparations were made for the beginning of regular operations in the season of 1912. Some necessary clearing of land was done and a large quantity of fencing material in the way of posts purchased and landed on the farm. A superintendent has not yet been appointed.

EXPERIMENTAL STATION AT KENTVILLE, N.S.

During the past season, about thirty acres of land was logged, stumped and broken on this farm. It is now in shape to be planted out to apple trees. In addition to the area mentioned, about one hundred acres more was logged as far as necessary and brushed preparatory to burning and stumping next summer.

Clearing land on Experimental Station, Kentville, N.S.

Indian Corn at Experimental Station, Ste Anne de la Pocatière, Que.

During the winter months, a large quantity of lumber, about 175,000 board feet, has been made off the farm. This lumber is to be used in the erection of houses for the superintendent and foreman, a barn for horses and cattle, a small office building and in repairing and remodelling an old house which was on the property when bought. This is to be converted into a double house, to accommodate the herdsman and the horticultural foreman or gardener.

EXPERIMENTAL STATION AT INVERMERE, B.C.

This land, acquired in 1910, has been cleared and broken ready for a crop in 1912. To the 35 acres originally acquired by the Department, 18 acres rough hillside and bottom land has been added. This additional land, while of small value at the present time, may eventually be found useful for some special lines of work with fruits or vegetables.

EXPERIMENTAL STATION AT SIDNEY, B.C.

In the summer of 1911, a farm offered to the Dominion Government by the British Columbia Electric Company, for Experimental Farm purposes, near Sidney, Saanich Peninsula, Vancouver Island, B.C., was visited by myself. This property was purchased by the Department in February, 1912. It is about 125 acres in extent and lies 16 miles north of Victoria and about one mile south of Sidney on the line of the British Columbia Electric, which divides it transversely into two nearly equal areas. The land rises gradually from the straits on which it fronts, to a point some few hundred feet west of or beyond the Victoria-Sidney road. In addition to the British Columbia Electric and the highway above mentioned, the farm is crossed by a railroad running from Victoria to Sidney. These three roads divide the property into four approximately equal parts.

The soil is, for the most part, loamy, verging in some parts to clay and in others to sand or light sandy loam. It will require drainage over a very large proportion of its area, and only a small part of the farm is in fit shape for cultivation on account of forest or stump and stone.

CROP ROTATION.

The important question of crop rotation has received considerable attention recently both at Ottawa and at some of the branch Farms.

By 'Crop Rotation,' 'Cropping System,' 'Course,' and numerous other expressions, is meant a certain sequence in crops which regularly repeats itself each time a series of crops is run. It really implies, further, that the crops follow each other in such order as to insure to each supplies of plant food suitable in quantity and character to produce the best returns from each crop grown. Hence, in arranging a rotation, it is very necessary to have some knowledge of the food requirements, and to know something of the values of the residues, of the different crops included.

Certain forage crops, such as corn, roots, potatoes and hay, require an immense amount of food suitable for stem, leaf and root production. This food is known as nitrates and is furnished by clover and other sod turned down, and in well-manured land. Other crops, such as cereals, can thrive with a lighter supply of nitrates, but need more phosphates, hence do well after some forage crop has taken up the superabundance of nitrates found after sod. It is evident, therefore, that a good rotation will include (1) meadow or pasture, (2) roots or corn, (3) some cereal crop.

Various combinations of these three groups are possible. Certain combinations are likely to give good results under conditions as they exist in the eastern provinces. Certain other combinations of these groups, with, possibly, the necessary inclusion of

a summer-fallow year in the course, are likely to prove satisfactory under climatic conditions as they exist in the prairie provinces.

A large number of combinations or rotations have been thought out and put under test in both the east and west. Below follows a list of those already under way for one year or longer.

CENTRAL FARM, EASTERN BRANCH FARMS OF STATIONS, AND B. C. BRANCH FARM.

Name.	Duration.	Description.	Location.	Remarks.
A.	5 years.....	Oats, corn, oats seeded down, clover hay, hay or pasture.	Ottawa, Charlottetown, Cap Rouge.	Land ploughed August 5th year, 10 lbs clover per acre for fertilizer first year, seeded red clover 8, alsike 2, timothy 10 lbs. 3rd year two crops hay expected 4th year.
B.	5 "	Grain seeded down, clover hay, corn, grain seeded down, clover hay.	Ottawa, Charlottetown, Cap Rouge, Nappan.	Seeded down 1st and 4th years, red clover 10, alsike 2, timothy 5 lbs.
C.	4 "	Hoed crop, grain seeded down, hay or pasture.	Ottawa, Charlottetown, Cap Rouge, Nappan, Kentville, Agassiz.	Hoed crop manured 20 tons per acre, seeded down red clover 10, alsike 2, timothy 12.
D.	3 "	Hoed crop, grain seeded down, hay.	Ottawa, Charlottetown, Cap Rouge, Nappan.	Manured 15 tons per acre, seeded down, alfalfa 12, red clover 6, timothy 6.
E.	3 "	Hoed crop, grain seeded down, pasture (cattle, sheep or swine.)	Ottawa.....	Same as D.
F.	4 "	Hoed crop, grain seeded down, clover hay, grain seeded to clover.	Charlottetown	Seeded clover 10, timothy 6, 2nd year; 4th year seeded 10 lbs. clover for fertilizer.
G.	7 "	Oats, hoed crop, wheat (seeded down), clover hay, timothy hay, pasture, pasture.	Charlottetown	Seeded red clover 8, alsike 2, timothy 12, 7th year fall-ploughed.
H.	3 "	Roots, grain seeded down, pasture (swine).	Ottawa.....	Same as D.
I.	6 "	Hoed crop, grain, hay, hay, pasture, grain.	Cap Rouge.....	20 tons manure per acre.
J.	6 "	Hoed crop, grain, hay, pasture, grain, hay.	Cap Rouge.....	24 tons manure per acre.
K.	6 "	Hoed crop, grain hay, hay pasture, pasture.	Cap Rouge.....	24 tons manure per acre.
N.	4 "	Hoed crop, grain, hay, pasture.	Ottawa.....	No manure or fertilizer of any kind used, seeded red clover 10, alsike 2, timothy 12.
P.	4 "	Hoed crop, grain seeded down, clover hay, timothy hay.	Ottawa.....	Deep ploughing, fourth year, plough August 7 in. deep, work with cultivator at intervals; land ploughed again late fall 7 in., manure 20 tons per acre.
R.	3 "	Hoed crop, grain, hay.	Ottawa	Seeded, alfalfa 12, red clover 6, timothy 6, all crops used for soiling, manure 15 tons per acre.
S.	4 "	Same as P.	Ottawa.....	Shallow ploughing, deep cultivation by stiff-toothed cultivator or subsoiler, seeded 10 lbs. red clover, 12 lbs. timothy per acre; fourth year, plough August, 4 in. deep; work at intervals, ridge up in fall; manure 20 tons per acre.
X.	4 "	Hoed crop, grain, hay, hay.	Ottawa.....	Barnyard manure, 15 tons per acre first year. Seeded red clover 10, alsike 2, timothy 12.
Y.	4 "	Same as X.	Ottawa...	No barnyard manure ; 100 lbs. nitrate of soda per acre each spring ; 75 lbs. muriate of potash, and 300 lbs. super-phosphate additional when in hoed crop.
Z.	4 "	Hoed crop, grain, hay, hay.	Ottawa..	7½ tons barnyard manure per acre 1st year; 100 lbs. nitrate of soda each year ; 37½ lbs. muriate of potash and 150 lbs. superphosphate additional when in hoed crop.

PRAIRIE FARMS.

Name.	Duration.	Description.	Location.	Remarks.
A.	1 year.....	Wheat each year.....	All prairie farms..	
B.	2 years.....	Summer-fallow, wheat, (fall wheat.)	Lethbridge.	
C.	3 years.....	Summer-fallow, wheat, wheat or coarse grain.	Indian Head, Rosthern, Scott, Lacombe, Lethbridge.	Spring or fall wheat, to be used according to location.
D.	4 years.....	Wheat, wheat, oats or barley, summer fallow.	Brandon.....	Manure applied on stubble of second year wheat, ploughed in in autumn.
E.	4 years.....	Same as D	"	No manure at any time.
F.	5 years.....	Wheat, wheat, corn, oats or barley seeded down, clover hay.	"	Meadow ploughed as soon as possible after hay harvest and worked rest of season. Seeded red clover 8, timothy 3, rye grass 4.
G.	6 years.....	Wheat, wheat, oats or barley seeded down, clover hay, pasture, corn.	"	Pasture ploughed late in summer and well worked. Corn stubble, merely cultivated, not ploughed before sowing to wheat. Seeded, red clover 8, timothy 5.
H.	6 years.....	Wheat, wheat, summer-fallow, oats seeded down, clover hay, pasture.	"	Pasture manured in mid-summer, ploughed and well cultivated during fall. Seeded rye grass 8, red clover 6, alsike 2.
I.	6 years.....	Flax, oats, summer-fallow, wheat seeded down, clover hay, pasture.	"	Seeded western rye 8, red clover 6, alsike 2.
J.	6 years.....	Summer-fallow, wheat, wheat, oats seeded down, hay, pasture.	Indian Head, Rosthern, Scott.	Seeded rye grass, red clover, alfalfa.
K.	6 years.....	Hoed crop, wheat, oats seeded down, hay, pasture, pasture.	Lacombe.....	Manured on first year hay stubble. Ploughed in July, second year pasture.
L.	6 years.....	Hay, pasture, pasture, wheat, oats, barley seeded down.	"	Seeded timothy 4, alsike 4, red clover 4.
M.	6 years.....	Summer-fallow, wheat, oats, summer-fallow, peas and oats for hay, barley or oats.	Lethbridge	
N.	7 years.....	Alfalfa, alfalfa, alfalfa, alfalfa, alfalfa, grain, grain.	Lacombe	Seeded down, no nurse crop, broken after first cutting, 5th year.
O.	7 years.....	Hoed crop, wheat, oats, summer-fallow, barley, hay, pasture.	"	Seeded timothy 3, alsike 2, alfalfa 6. Last year ploughed early July.
P.	8 years.....	Fallow, wheat, wheat, fallow, corn, barley, hay, pasture.	Indian Head, Rosthern, Scott.	Fifth year crop, 15 tons manure per acre. Seeded rye grass, red clover, alfalfa.
Q.	8 years.....	Roots, wheat, hay, hay, pasture, pasture, pasture, rape.	Brandon.....	Sheep rotation. Seeded mixture grasses and clovers. Seventh year pasture, ploughed midsummer and backset.
R.	9 years.....	Fallow, hoed crop, wheat, oats, fallow, wheat, oats seeded down, hay, pasture.	Indian Head, Rosthern, Scott, Lethbridge.	Hoed crop, manured 15 tons per acre. Seeded rye grass, red clover, alfalfa.
S.	9 years.....	Fallow, hoed crop, wheat, fallow, wheat, oats, fallow, peas and oats for hay pasture.	Lethbridge.....	Manure applied on summer-fallow seventh year. Seeded to rye for pasture after hay crop harvested eighth year.
T.	10 years.....	Summer-fallow, wheat, oats, fallow, seeded alfalfa, late June, alfalfa, alfalfa, alfalfa, fallow, hoed crop, wheat.	"	Alfalfa sown in rows 21 inches apart. Manure applied on wheat stubble tenth year.
U.	.....	Seeding alfalfa, alfalfa, alfalfa, alfalfa, alfalfa, hoed crop, wheat, wheat, oats.	"	Irrigated.
V.	.....	Alfalfa continously.	"	Irrigated.
W.	10 years	Wheat, wheat, corn, oats, barley, alfalfa, alfalfa, alfalfa, alfalfa, alfalfa.	Brandon.....	Alfalfa sown 6th year without nurse crop, alfalfa ploughed up in midsummer, 10th year.

CULTURAL PROBLEMS ON THE PRAIRIES.

On the prairies, some of the most difficult problems to solve are those having to do with breaking virgin prairie, preparatory to crop production; moisture conservation; forage crop production; conservation or increase of soil fertility and weed eradication. With a view to gaining some information as to methods of cultivation likely to give best results along the lines mentioned, the investigational work outlined below has been begun at Brandon, Indian Head, Rosthern, Scott, Lacombe and Lethbridge.

EXPERIMENT No 1.

PRAIRIE BREAKING.

1. Ploughed 3 inches to 4 inches early spring, pack, double disc, harrow, double disc, sow to peas and oats.
2. Ploughed 3 inches to 4 inches early spring, pack, double disc, harrow, double disc, sow to flax.
3. Ploughed 3 inches to 4 inches early spring, pack, double disc, harrow, sow to flax.
4. Broken early June, 4 inches to 5 inches, kept cultivated from day broken.
5. Broken early June, 2 inches to 3 inches, rolled, backset early September, kept cultivated from day broken.
6. Broken early spring 4 inches, worked and sown to fall wheat (Lethbridge only).

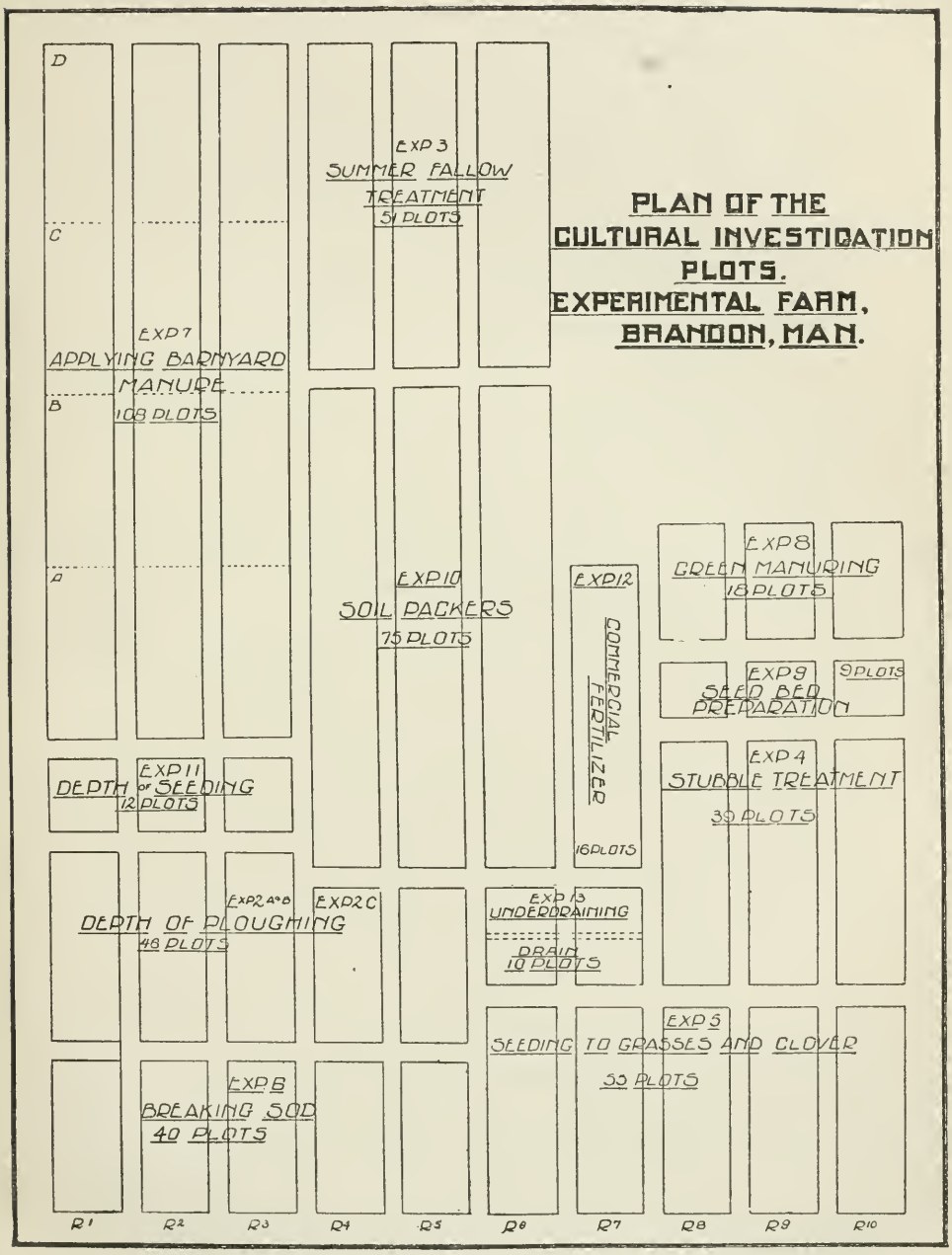
Only five plots required each year.
1st year.—To be treated as above.
2nd year.—Plots to be in wheat.
3rd year.—Plots to be in wheat.
4th year.—Summer-fallow.
5th year.—Wheat.
Experiment to be continued five years with new land each year.
Flax.—30 to 40 lbs. per acre, sow 15th to 25th May.
Peas and Oats.—1 bushel oats, 2 bushels peas per acre.

EXPERIMENT No. 2.

DEPTH OF PLOUGHING.

Ploughing on wheat stubble to be sown to oats:—

A. 1. Ploughing three (3) inches deep.
2. Ploughing four (4) inches deep.
3. Ploughing five (5) inches deep.
4. Ploughing five (5) inches deep.
5. Ploughing five (5) inches deep.
6. Ploughing five (5) inches deep.
7. Ploughing five (5) inches deep.
8. Ploughing five (5) inches deep.
9. Ploughing five (5) inches deep.
10. Ploughing five (5) inches deep.


PLAN OF THE CULTURAL INVESTIGATION PLOTS. EXPERIMENTAL FARM, BRANDON, MAN.
D
C
B
A
EXP 3
SUMMER FALLOW
TREATMENT
51 PLOTS
EXP 7
APPLYING BARNYARD MANURE
108 PLOTS
EXP 10
SOIL PACKERS
75 PLOTS
EXP 12
COMMERCIAL FERTILIZER
16 PLOTS
EXP 8
GREEN MANURING
18 PLOTS
EXP 9
SEED BED PREPARATION
9 PLOTS
EXP 4
STUBBLE TREATMENT
35 PLOTS
EXP 11
DEPTH OF SEEDING
12 PLOTS
EXP 2 A-B
EXP 2 C
DEPTH OF PLOUGHING
48 PLOTS
EXP 13
UNDERDRAINING
DRAIN
10 PLOTS
EXP 5
SEEDING TO GRASSES AND CLOVER
55 PLOTS
EXP B
BREAKING SOD
40 PLOTS
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10

Ploughing for summer-fallow:—

B 1. Ploughing three (3) inches deep.
2. Ploughing four (4) inches deep.
3. Ploughing five (5) inches deep.
4. Ploughing six (6) inches deep.
5. Ploughing seven (7) inches deep.
6. Ploughing eight (8) inches deep.
7. Ploughing five (5) inches deep, subsoil 4 inches.
8. Ploughing six (6) inches deep, subsoil 4 inches.
9. Ploughing seven (7) inches deep, subsoil 4 inches.
10. Ploughing eight (8) inches deep, subsoil 4 inches.

On sod:—

C 11. Ploughing three (3) inches deep sod and stubble.
12. Ploughing four (4) inches deep sod and stubble.
13. Ploughing five (5) inches deep sod and stubble.
14. Ploughing three (3) inches deep on sod and 6 inches deep fall or spring after wheat.

On plots 1 to 10 a three-year rotation is to be followed.
1st year.—Summer-fallow.
2nd year.—Wheat, plough late September.
3rd year.—Oats, disc early autumn.

In this way, plot 1 is ploughed 3 inches deep as summer-fallow and 3 inches deep as stubble; plot No. 2, 4 inches deep as summer-fallow and 4 inches deep as stubble; plot No. 5, 7 inches deep as summer-fallow and 5 inches deep as stubble. In cases of all other plots stubble is ploughed 5 inches deep.

On plots 11, 12, 13 and 14, a four-year rotation is to be followed.

1st year.—Wheat. Ploughed fall or spring same depth as when ploughed from sod, except plot 14.

2nd year.—Oats. Seeded down rye grass 5 lbs., timothy 5 lbs., red clover 5 lbs., alfalfa, 5 lbs.

3rd year.—Hay.

4th year.—Hay. Plough right after hay is cut, cultivate rest of season to insure rotting of sod.

For this work, 30 plots are required for summer-fallow and stubble ploughing and 16 plots for sod ploughing, or 46 plots in all.

On plots 1 to 10, manure 6 tons per acre on wheat stubble, early fall.

On plots 11, 12, 13 and 14, manure 8 tons per acre autumn, first year in hay.

EXPERIMENT No. 3.

SUMMER-FALLOW TREATMENT.

1. Plough 4 inches June, pack if necessary and practicable, cultivate as necessary.
2. Plough 6 inches June, pack if necessary and practicable, cultivate as necessary.
3. Plough 8 inches June, pack if necessary and practicable, cultivate as necessary.
4. Plough 4 inches June, cultivate; plough 4 inches September, harrow.
5. Plough 6 inches June, cultivate; plough 6 inches September, harrow.
6. Plough 8 inches June, cultivate; plough 8 inches September, harrow.
7. Plough 6 inches June, cultivate; plough 4 inches September, harrow.
8. Plough 4 inches June, cultivate; plough 6 inches September, harrow.

9. Plough 4 inches June, early as possible, cultivate; plough 6 inches September, leave untouched.

10. Plough 5 inches June, seed to rape or other green forage crop and pasture off.

11. Plough 6 inches May 15, harrow and pack if necessary, cultivate as necessary.

12. Plough 6 inches June 15, harrow and pack if necessary, cultivate as necessary.

13. Plough 6 inches July 15, harrow and pack if necessary, cultivate as necessary.

14. Fall cultivate before summer-fallowing. Plough 6 inches June, harrow and pack if necessary, cultivate as necessary.

15. Fall plough 4 inches before summer-fallowing. Plough 6 inches June, harrow and pack if necessary, cultivate as necessary.

16. Plough 6 inches June, pack, cultivate as necessary.

17. Plough 6 inches June, no packing, otherwise same as other plots.

For this work, three groups of 17 plots each are required. A three-year rotation is followed.

1st year.—Summer-fallow.
2nd year.—Wheat.
3rd year.—Oats.

Plough as early in June as possible, excepting plots 11, 12 and 13.

Apply 6 tons manure per acre on first year stubble in early fall.

EXPERIMENT No. 4.

STUBBLE TREATMENT.

Wheat Stubble and Sowing to Wheat.

1. Plough—Autumn.
2. Disc harrow—Autumn.
3. Burn stubble, then disc—Autumn.
4. Burn stubble, then plough—Autumn.
5. Burn stubble in spring—Seed at once.
6. Plough in spring—Seed at once.
7. Disc at cutting time—Spring plough.
8. Disc at cutting time—Autumn plough.
9. Plough autumn—Subsurface pack at once.
10. Plough spring—Seed—Subsurface pack.

Wheat Stubble but Sowing to Oats.

11. Plough autumn—Subsurface pack at once.
12. Plough spring—Seed—Subsurface pack.
13. Cultivate autumn—Spring plough—Seed.

In each case such additional cultivation before seeding to be given in spring as may seem necessary to prepare a good seed bed. Packer not to be used except where mentioned.

This line of experiments requires 39 plots. A three-year rotation is followed:

1st year.—Summer-fallow.
2nd year.—Wheat.
3rd year.—Wheat—plots 1 to 10.
Oats—plots 11 to 13.

All summer-fallow ploughing to be 6 inches deep early in June.

Ploughing stubble for wheat 4 inches in fall and 4 inches in spring.

Ploughing stubble for oats 5 inches in fall and 5 inches in spring.

EXPERIMENT No. 5.

SEEDING TO GRASS AND CLOVER.

1. Seeding rye grass 10 lbs. and red clover 10 lbs. with nurse crop on summer-fallow.
2. Seeding rye grass 10 lbs. and red clover 10 lbs. alone after summer-fallow.
3. Seeding rye grass 10 lbs. and red clover 10 lbs. with nurse crop on first year after hoed crop.
4. Seeding rye grass 10 lbs. and red clover 10 lbs. alone after hoed crop.
5. Seeding rye grass 10 lbs. and red clover 10 lbs. with nurse crop on first year wheat stubble.
6. Seeding rye grass 10 lbs. and red clover 10 lbs. alone after first year wheat.
7. Seeding rye grass and red clover with oats to cut green on first year wheat stubble.
8. Seeding rye grass 10 lbs. and red clover 10 lbs. alone on first year wheat stubble, manure 8 tons per acre, ploughed preceding fall.
9. Seeding rye grass 10 lbs. and red clover 10 lbs. with nurse crop on second year wheat stubble.
10. Seeding rye grass 10 lbs. and red clover 10 lbs. alone after second year grain (oats).
11. Seeding rye grass 10 lbs. and red clover 10 lbs. with nurse crop on second year after hoed crop.

For this work, 55 plots are required, 5 groups of 11 each. Each plot is left at least 2 years in grass excepting plots 9 and 10, and is left long enough to permit of the right point in the rotation being reached to allow seeding according to directions, the object being to try methods of seeding, regardless of other considerations. All plots in any one range to be seeded down the same year.

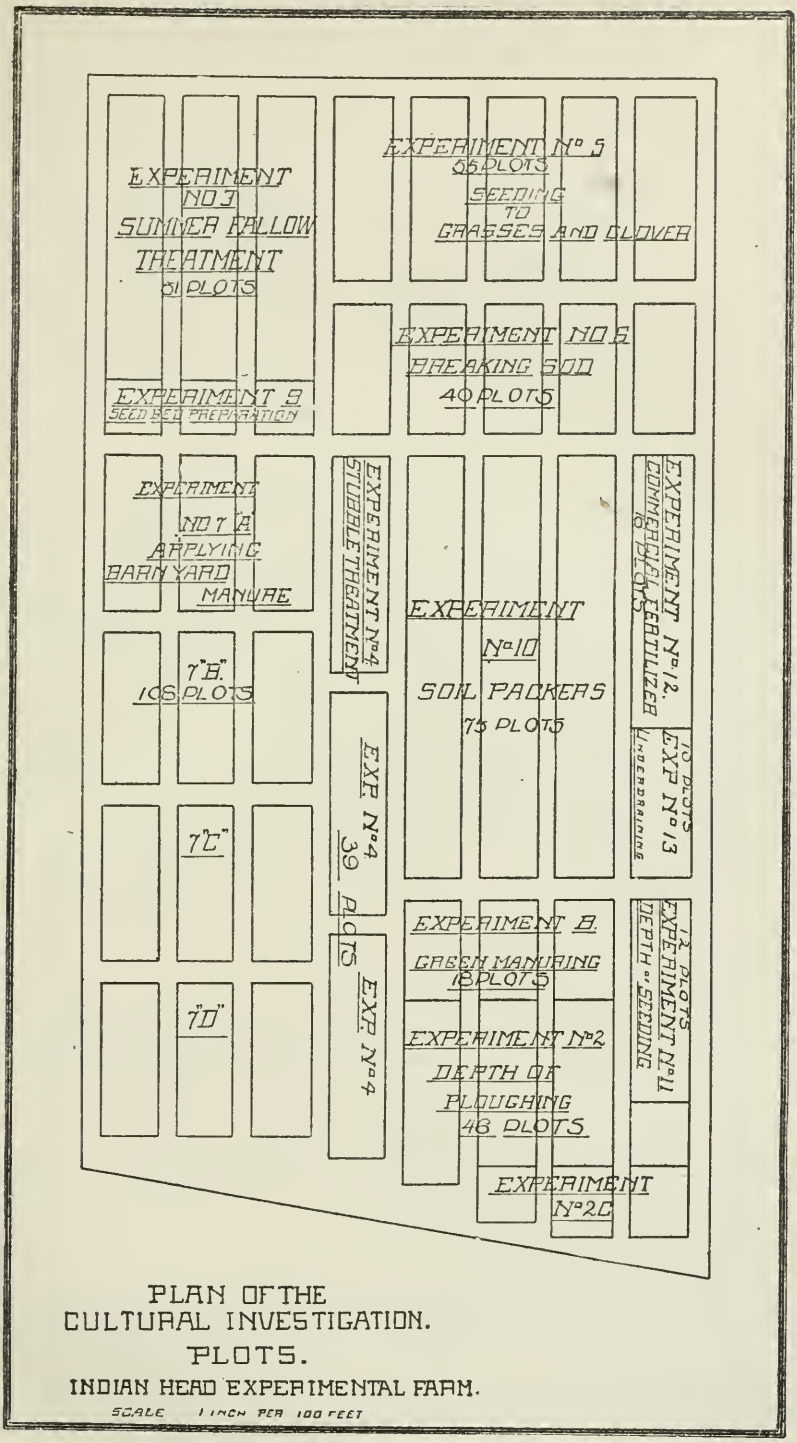
Barnyard manure is applied autumn of first year in grass, 12 tons per acre.

Rotations followed in Seeding to Grass and Clover Experiments.

Since the rotations necessary to follow to bring each plot into proper shape for seeding to grass must vary, the rotation for each plot is given below. All rotations will be of five years' duration. All grass seeding to be done on one range each year.

SEEDING to Grass and Clover Rotations.

Plot.	1st Year.	2nd Year.
1	Fallow	Seeded with wheat.
2	"	Seeded alone.
3	Hoed crops	Seeded with wheat.
4	"	Seeded alone.
5	Wheat	Seeded with wheat on stubble.
6	"	Seeded alone.
7	"	Seeded with oats on wheat stubble.
8	"	Seeded alone.
9	"	Seeded with wheat.
10	Oats	Seeded alone.
11	Wheat	Seeded with wheat.



PLAN OF THE
CULTURAL INVESTIGATION.
PLOTS.
INDIAN HEAD EXPERIMENTAL FARM.
SCALE 1 INCH PER 100 FEET

SEEDING to Grass and Clover Rotations—*Continued.*

Plot.	3rd Year.	4th Year.	5th Year.
1	Hay	Hay	Hay
2	"	"	"
3	"	"	"
4	"	"	"
5	"	"	Summer-fallow
6	"	"	"
7	"	"	"
8	"	"	"
9	"	Summer-fallow	Wheat
10	"	"	"
11	"	Hay	Hoed crop.

EXPERIMENT No. 6.

BREAKING SOD FROM CULTIVATED GRASSES AND CLOVERS.

1. Plough July 20 to 30, 5 inches deep. Pack and disc at once—disc in fall.
2. Plough October, 5 inches deep—pack—disc harrow.
3. Plough early July 3 inches deep—backset September, cultivate as necessary.
4. Stiff-tooth rip July—plough 5 inches deep September—cultivate.
5. Spring plough 5 inches deep—seed same spring to wheat.
6. Duplicate No. 5—sow flax.
7. Repeat No. 5—sow peas.
8. Plough May 15—work as summer-fallow.

In each case, necessary cultivation to be given at right time to insure success. Packer to be used on every plot at right time.

Forty plots are required for this experiment. Five groups of eight each in five-year rotation:—

1st year.—(1911). Seed down, no nurse crop, western rye grass 10 lbs., alfalfa 3 lbs., clover 3 lbs. per acre.

2nd year.—Hay.

3rd year.—Hay.

4th year.—Break.

5th year.—Crop, and seed western rye grass 10 lbs., alfalfa 3 lbs., red clover 3 lbs. Leave stubble and new seeds as long as possible in order to be able to judge of catch of seed, then plough and prepare for seeding next spring without nurse crop, as in first year of rotation.

In 1911.—Whole area will be seeded down without nurse crop.

In 1912.—Whole area will be under hay.

In 1913.—First group of eight to be broken according to scheme; rest in hay.

In 1914.—First group of eight to be in grain, seeded down as described and reploughed in fall.

Second group of eight to be broken.

Rest of groups in hay.

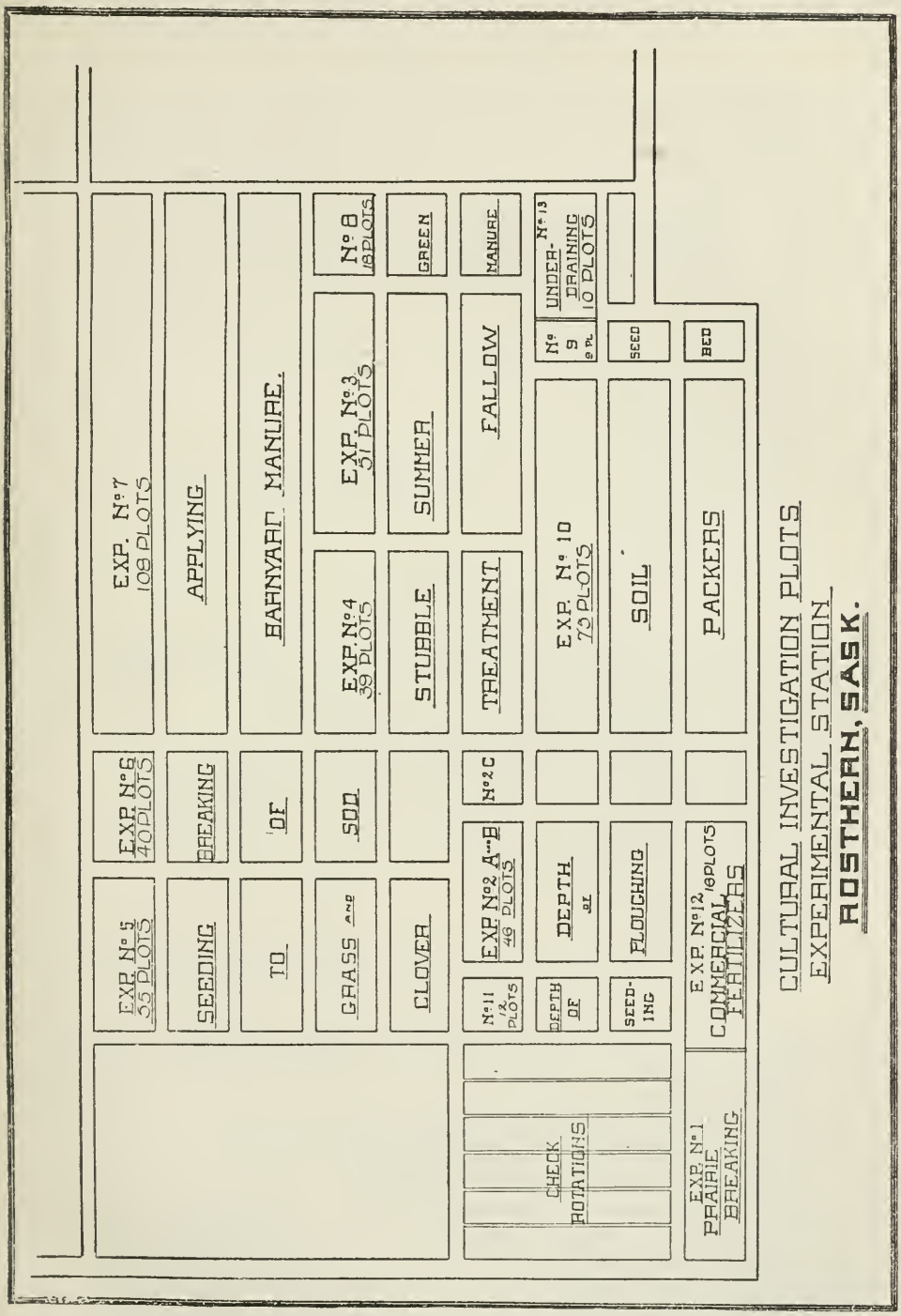
In 1915.—First group seeded down, no nurse crop.

Second group to be in grain seeded down as described, then fall ploughed

Third group to be broken.

Rest of groups in hay.

In 1916.—First group in first year hay, etc.


EXP. N° 7
108 PLOTS
APPLYING
BARNYARD MANURE.
EXP. N° 8
68 PLOTS
GREEN
MANURE
EXP. N° 6
40 PLOTS
BREAKING
OF
SOD
EXP. N° 4
39 PLOTS
EXP. N° 3
51 PLOTS
SUMMER
FALLOW
UNDER-DRAINING
N° 13
10 PLOTS
N° 9
9 PL.
EXP. N° 5
35 PLOTS
SEEDING
TO
GRASS AND
CLOVER
STUBBLE
TREATMENT
EXP. N° 10
73 PLOTS
SOIL
PACKERS
SEED
BED
N°2C
EXP. N°2 A-B
46 PLOTS
DEPTH
OF
PLOUGHING
N°11
12
PLOTS
DEPTH
OF
SEED-
ING
EXP. N°12
COMMERCIAL FERTILIZERS
16 PLOTS
CHECK
ROTATIONS
EXP. N°1
PRAIRIE
BREAKING
CULTURAL INVESTIGATION PLOTS
EXPERIMENTAL STATION
ROSTHERN, SASK.

EXPERIMENT No. 7.

APPLYING BARNYARD MANURE.

On Corn or Roots.

A. 1. No manure, second year stubble, ploughed in autumn.
2. Apply on surface in autumn after ploughing second year stubble, and work in at once.
3. Apply in spring on surface of ploughed land, second year stubble and work in at once.
4. Plough in autumn right after applying, second year stubble.
5. Plough in spring right after applying, second year stubble.
6. Winter apply, plough in spring, second year stubble.
7. Winter apply, green manure (cut straw) on second year stubble—plough in spring.
8. Winter apply, green manure (cut straw) on summer-fallow—disc in.
9. Summer-fallow—Hoed crop—Wheat.

Three-year rotation followed:—
1st year.—Hoed crop.
2nd year.—Wheat.
3rd year.—Wheat.

In case of plots No. 8 and 9 a special rotation as follows:—
1st year.—Hoed crop.
2nd year.—Wheat.
3rd year.—Summer-fallow.

On Wheat.

B. 1. Apply in winter green manure (cut straw) first year stubble. Disc in.
2. Apply in winter green manure (cut straw) summer-fallow. Disc in.
3. Apply with spreader after grain sown on first year stubble.
4. Apply with spreader after grain sown on summer-fallow.
5. No manure. Fall ploughed. First year stubble.
6. Apply on surface first year stubble and plough in in autumn.
7. Apply on surface first year stubble and plough in in spring .
8. No manure. Disc. First year stubble.
9. No manure. Burn stubble.

Three-year rotation to be followed:—
1st year.—Summer-fallow.
2nd year.—Wheat.
3rd year.—Wheat.

Manure applied to affect second year crop of wheat unless otherwise stated.

On Barley.

C. 1. Apply in winter green manure (cut straw) on first year stubble. Disc in.
2. Apply in winter green manure (cut straw) on summer-fallow, sow barley on summer-fallow.
3. Apply with spreader after barley sown on first year stubble.
4. Apply with spreader after seeding barley on summer-fallow.
5. No manure. Fall ploughed. First year stubble.
6. Apply on surface first year stubble and plough in in autumn.
7. Apply on surface first year stubble and plough in in spring.
8. No manure. Disc. First year stubble.
9. No manure. Burn stubble.

Three-year rotation to be followed:—
1st year.—Summer-fallow.

2nd year.—Wheat or barley as indicated.
3rd year.—Barley, or oats as indicated; where barley follows summer-fallow, oats to follow barley.
Manure to be applied to affect crop of barley.

On Oats.

D. 1. Apply in winter green manure (cut straw)) on first year stubble. Disc in.
2. Apply in winter green manure (cut straw) on summer-fallow, sow oats on summer-fallow.
3. Apply with spreader after grain sown on first year stubble.
4. Apply with spreader after seeding to oats on summer-fallow.
5. No manure. Fall ploughed. First year stubble.
6. Apply on surface first year stubble and plough in in autumn.
7. Apply on surface first year stubble and plough in in spring.
8. No manure. Disc. First year stubble.
9. No manure. Burn stubble.

Three-year rotation to be followed:—
1st year.—Summer-fallow.
2nd year.—Wheat or oats as indicated.
3rd year.—Oats or barley as indicated; where oats follows summer-fallow, barley should follow oats.
Manure applied to affect crop of oats.

EXPERIMENT No. 8.

GREEN MANURING.

1. Summer-fallow.
2. Peas, two bushels Golden Vine (or other similar variety) ploughed under early in July.
3. Peas, two bushels Golden Vine, ploughed under when in blossom.
4. Tares, one bushel per acre, ploughed under late July.
5. Summer-fallow, barnyard manure, 12 tons per acre, applied on summer-fallow in September.
6. Summer-fallow.

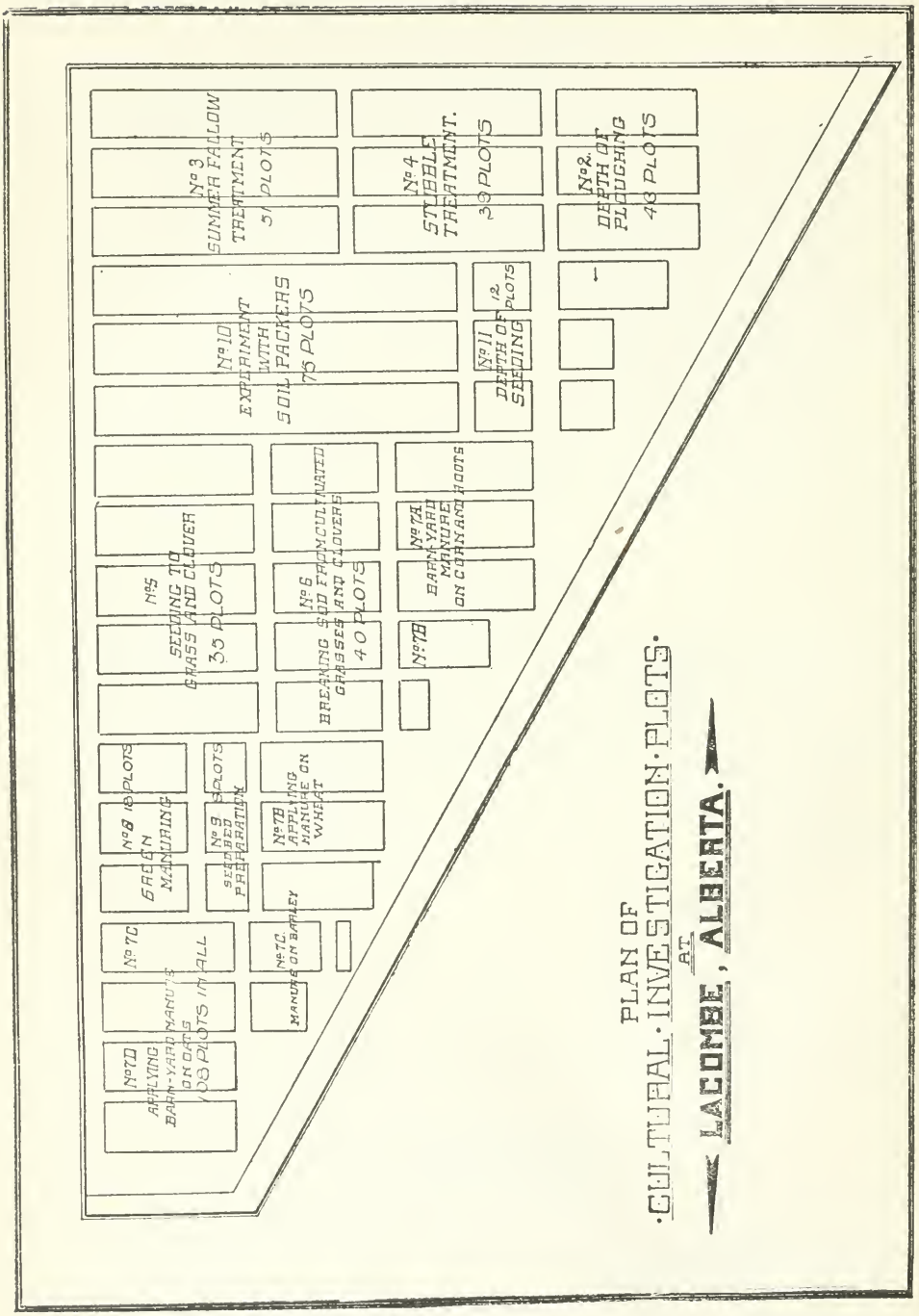
For this work, three groups of plots of six each, or 18 plots in all, are required.
In 1911.—Group 1. Treated.
Group 2. Wheat.
Group 3. Oats.
In 1912.—Group 1. Wheat.
Group 2. Oats.
Group 3. Treated.
In 1913.—Group 1. Oats.
Group 2. Treated.
Group 3. Wheat.

EXPERIMENT No. 9.

SEED BED PREPARATION.

1. Poor preparation.
2. Good preparation.
3. Extraordinary preparation.

To carry on this experiment, three groups of three plots each will be required, or nine plots in all.


PLAN OF
CULTURAL INVESTIGATION PLOTS
AT
LACOMBE, ALBERTA.
No 1 DEPTH OF PLOUGHING 48 PLOTS
No 2 STUBBLE TREATMENT. 36 PLOTS
No 3 SUMMER FALLOW TREATMENT 54 PLOTS
No 4 EXPERIMENT WITH SOIL PACKERS 75 PLOTS
No 5 SEEDING TO GRASS AND CLOVER 35 PLOTS
No 6 BREAKING SOD FOR CULTIVATED GRASSES AND CLOVERS 40 PLOTS
No 7 BARN YARD MANURE ON CORN AND ROOTS
No 7A BARN YARD MANURE ON CORN AND ROOTS
No 7B APPLYING MANURE ON WHEAT
No 7C MANURE ON BARLEY
No 8 GREEN MANURING 18 PLOTS
No 9 SEEDBED PREPARATION 9 PLOTS
No 10 EXPERIMENT WITH SOIL PACKERS 75 PLOTS
No 11 DEPTH OF SEEDING 12 PLOTS
No 12 APPLYING BARN-YARD MANURE ON OATS 108 PLOTS IN ALL

1911 Group—1. Summer-fallow.
2. Wheat.
3. Oats.
1912 Group—1. Wheat.
2. Oats.
3. Summer-fallow.
1913 Group—1. Oats.
2. Summer-fallow.
3. Wheat.

What constitutes 'poor,' 'good,' or 'extraordinary' preparation of the seed bed cannot, of course, be described or outlined, hence the judgment of the experimenter will have to be exercised and such preparation given the plot in question as he deems will come nearest being described by the word used, 'poor,' 'good,' or 'extraordinary.'

In the summer-fallow year, all plots are to be treated alike. The treatment when seeding on summer-fallow land the next spring must, however, be such as to merit the descriptive words.

Manure 6 tons per acre on first year stubble.

EXPERIMENT No. 10.

SOIL PACKERS.

Sowing Wheat on Summer-Fallow.

A.

Spring work when seeding.

1. Harrow, seed.
2. Harrow, seed, surface pack.
3. Harrow, seed, surface pack, harrow.
4. Harrow, seed, subsurface pack.
5. Harrow, seed, subsurface pack, harrow.
6. Harrow, seed, combination pack.
7. Harrow, seed, combination pack, harrow.
8. Surface pack, seed, surface pack.
9. Subsurface pack, seed, subsurface pack.
10. Combination pack, seed, combination pack.
11. Surface pack, harrow, seed.
12. Subsurface pack, harrow, seed.
13. Combination pack, harrow, seed.
14. Harrow, seed.
15. Plough for summer-fallow, surface pack, cultivate; next spring, smoothing harrow, seed.
16. Plough for summer-fallow, subsurface pack, cultivate; next spring, smoothing harrow, seed.
17. Plough for summer-fallow, combination pack, cultivate; next spring, smoothing harrow, seed.
18. Plough for summer-fallow, surface pack, cultivate; next spring, smoothing harrow, seed, surface pack.
19. Plough for summer-fallow, subsurface pack, cultivate; next spring, smoothing harrow, seed, subsurface pack.
20. Plough for summer-fallow, combination pack, cultivate; next spring, smoothing harrow, seed, combination pack.

Spring work when seeding.

21. Harrow, seed.
22. Harrow, seed, harrow when 6 inches high.
23. Harrow, seed, surface pack when 6 inches high.
24. Harrow, seed; roll when 6 inches high.
25. Harrow, seed.

Sowing on Spring Ploughed Stubble Land.

B.

1. Harrow, subsurface pack, harrow, seed.
2. Harrow, surface pack, harrow, seed.
3. Harrow, combination pack, harrow, seed.
4. Harrow, subsurface pack, harrow, seed, subsurface pack.
5. Harrow, surface pack, harrow, seed, surface pack.
6. Harrow, combination pack, harrow, seed, combination pack.
7. Harrow, seed, harrow.
8. Harrow, seed, surface pack.
9. Harrow, seed, subsurface pack.
10. Harrow, seed, combination pack.
11. Harrow, seed.

Sowing on Fall Ploughed Stubble Land.

C.

12. No packer, harrow, seed.
13. Subsurface pack in fall, seed in spring.
14. Subsurface pack in spring, then seed.
15. Subsurface pack in spring, after seeding.
16. Surface pack in fall, seed in spring.
17. Surface pack in spring, then seed.
18. Surface pack in spring after seeding.
19. Combination pack in fall, seed in spring.
20. Combination pack in spring, then seed.
21. Combination pack in spring after seeding.
22. No packer, harrow, seed.
23. Surface pack in fall, seed, surface pack.
24. Subsurface pack in fall, seed, subsurface pack.
25. Combination pack in fall, seed, combination pack.

To carry on this work, 75 plots are necessary, three groups of 25 each. Each year the experiments on summer-fallow are tried on the group under summer-fallow the previous year.

A three-year rotation is followed:—

1st year—Summer-fallow.
2nd year—Wheat.
3rd year—Wheat.

Manure applied 6 tons per acre on stubble of second crop after summer-fallow, that is, fall previous to summer-fallow.

Method of summer-fallowing:—Fall disc, plough before June 15, cultivate as necessary; plots 1 to 14 inclusive, and 21 to 25 inclusive. In case of plots 15 to 20 inclusive, summer-fallow as indicated in Exp. No. 10, Section A.

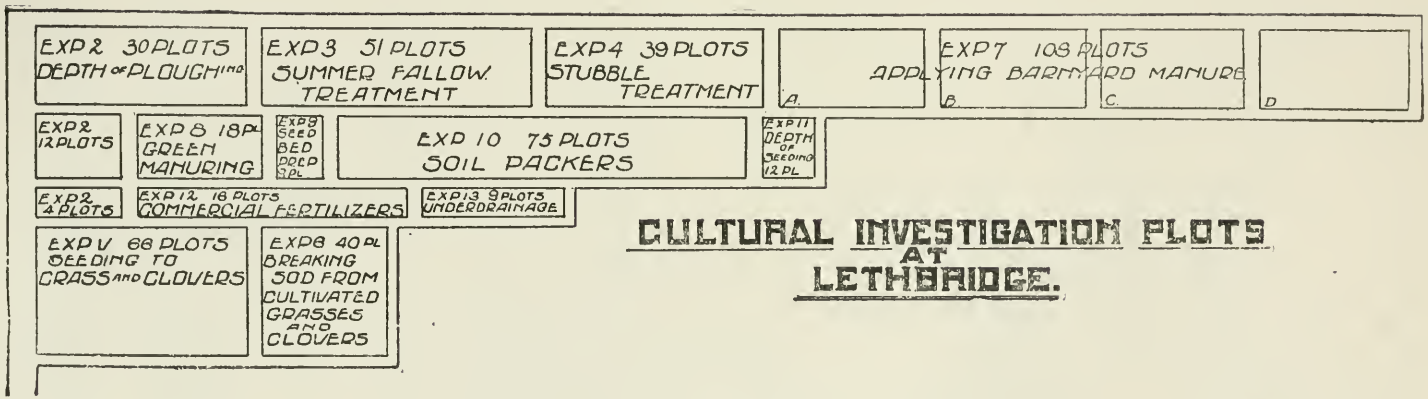
EXPERIMENT No. 11.

DEPTH OF SEEDING.

1. Sowing 1 inch deep.
2. Sowing 2 inches deep.
3. Sowing 3 inches deep.
4. Sowing 4 inches deep.

For this work 12 plots will be necessary—three groups of four plots each.

Group 1—1911. Summer-fallow.
1912. Wheat.
1913. Oats.



CULTURAL INVESTIGATION PLOTS AT LETHBRIDGE.

Group 2—1911. Oats.
1912. Summer-fallow.
1913. Wheat.
Group 3—1911. Wheat.
1912. Oats.
1913. Summer-fallow.
Wheat on summer-fallow.
Oats on stubble.
Stubble to be fall ploughed and packed.
Manure 6 tons per acre in autumn on wheat stubble.

EXPERIMENT No. 12.

COMMERCIAL FERTILIZER.

1. Check. No fertilizer.
2. N. Eight pounds Nitrate of Soda.
3. $P_2 O_5$. Fifteen pounds Superphosphate.
4. $K_2 O$. Five pounds Muriate of Potash.
5. Check. No fertilizer.
6. N. $P_2 O_5$. $K_2 O$.
7. N. $P_2 O_5$.
8. N. $K_2 O$.
9. $P_2 O_5$. $K_2 O$.
10. Check. No fertilizer.
11. Basic Slag, 25 lbs.
12. Clover in place of grass.
13. Clover in place of grass.
14. Barnyard manure, 16 tons.
15. Barnyard manure, 8 tons.
16. Check. No fertilizer.

Only 16 plots required, all in same range.

On these plots a four-year rotation is to be followed:—

1st year.—Wheat, all plots.
2nd year.—Oats, all plots.
3rd year.—Grass, all plots.
4th year.—Corn, all plots.

All commercial fertilizers to be applied on the surface each spring before seeding.

Barnyard manure to be applied on surface and worked in in fall before corn.

Grass land to be ploughed shallow after one crop hay and kept cultivated rest of season preceding corn.

EXPERIMENT No. 13.

UNDERDRAINING.

1. No drainage.
2. No drainage.
3. Well 4 feet by 4 feet by 6 feet deep, drain 3 feet deep.
4. No drainage.
5. No drainage.
6. No drainage.
7. Well 4 feet by 4 feet by 6 feet deep, drain 4 feet deep.
8. No drainage.
9. No drainage.

For this work, only nine plots will be required. These plots should be so located as to permit of tile drains being laid from plots 3 and 7 with a good fall into a suitable outlet, natural or artificial. All plots to be in same range.

Crops would be:—

1911.—Wheat, all plots.

1912.—Wheat, all plots.

1913.—Summer-fallow, all plots.

Apply 6 tons manure per acre, fall or winter, on the ploughed 6-inch stubble first year after summer-fallow.

BULLETINS AND PAMPHLETS ISSUED DURING THE YEAR ENDING MARCH 31, 1912.

In addition to a reprint of the French edition of Bulletin 46, on Alfalfa or Lucerne, six new bulletins were issued during the year.

In the Regular Series, Bulletin No. 69, on The Honey Bee: A Guide to Apiculture in Canada, was prepared by the Dominion Entomologist, Dr. C. Gordon Hewitt. As its name implies, it is intended to serve as a guide to those commencing bee-keeping or whose knowledge of the subject is limited, rather than as an exhaustive treatise on bees and apiculture. It contains instructions as to proper location and suitable equipment of apiaries. It discusses the different races of bees and their relative advantages, bee management, the handling of wax and honey and the diseases and enemies which attack the bee. It also gives, *in extenso*, the existing legislation in Canada bearing on bee diseases.

Bulletin No. 70, on Cutworms and Army-worms, by Arthur Gibson, Chief Assistant Entomologist, gives the life-histories of several species of these insects, an account of the injuries they inflict on crops and the various methods practised for their control.

Bulletin No. 71, prepared by the Dominion Cerealist, Dr. C. E. Saunders, with the co-operation of the Superintendents of the branch Experimental Farms and Stations, gives the results obtained on all the Dominion Experimental Farms from trial plots of grains, fodder corn, field roots and potatoes. Lists are also given of the varieties best suited to each province or district, based on the accumulated experience of the period of seventeen years during which this publication has been issued.

Bulletin No. 7, of the Second Series, entitled 'The Destructive Insect and Pest Act and Regulations issued thereunder,' was prepared by the Dominion Entomologist, Dr. C. Gordon Hewitt. It contains the text of the Act passed in May, 1910, governing the importation of nursery stock and the regulations necessary for its administration.

No. 8, of the Second Series, on Alfalfa Growing in Alberta, was prepared jointly by W. H. Fairfield, M.S., Superintendent of the Experimental Station at Lethbridge, Alberta, and G. H. Hutton, B.S.A., Superintendent of the Experimental Station at Lacombe, in the same province. It treats of the possibilities and methods of growing alfalfa in Alberta, both under irrigated and non-irrigated conditions, and of the varieties found most suitable there.

Bulletin No. 9, of the Second Series, by the Dominion Entomologist, Dr. C. Gordon Hewitt, treats of the legislation in Canada dealing with the control of insect pests and summarizes briefly the history and progress of the work to that end.

CORRESPONDENCE.

The following is a summary of the correspondence carried on during the year from the different Divisions of the Central Farm and from the branch Experimental Farms and Stations.

CENTRAL FARM.

Division.	Letters Received.	Letters Sent.
Director (and acting Agriculturist)	31,357	14,945
Horticulturist	4,964	5,399
Cerealist	13,223	5,148
Chemist	2,263	2,205
Entomologist	3,993	5,465
Botanist	1,079	1,373
Poultry Manager	4,956	6,473
French Correspondent	9,955	1,079
Miscellaneous	14,468	4,792
	86,258	46,879

REPORTS, BULLETINS AND CIRCULARS.

Reports and Bulletins Mailed	97,519
Circulars *re* Distribution of Seed Grain	34,989

NOTE.—In explanation of the comparatively small number of reports and bulletins mailed, it may be stated that in January, 1912, the distribution of the Reports and Bulletins of the Experimental Farms was taken over by the Publications Branch of the Department of Agriculture, to whom, in future, applications for such reports and bulletins should be made.

BRANCH EXPERIMENTAL FARMS AND STATIONS.

Farm or Station.	Letters. Received.	Letters Sent.
Charlottetown	1,013	909
Nappan	2,482	2,215
Cap Rouge	1,604	1,974
Brandon	3,715	3,757
Indian Head	16,407	16,206
Rosthern	873	535
Scott	646	565
Lethbridge	3,670	3,756
Lacombe	4,591	4,033
Agassiz	2,825	2,635
	37,736	36,675

The above figures for the branches are exclusive of reports, bulletins and circulars sent out.

By adding the figures for the Central and Branch Farms, the total number of letters received is seen to be 123,994 and those sent out 83,554.

SEED DISTRIBUTION.

The annual distribution of samples of seed grain of superior quality was carried on as usual in 1911, under new regulations which, while lessening considerably the number sent out, tend to ensure the samples falling into the hands of those who will make good use of them. Applications for samples of grain from all parts of the Dominion and for potatoes from Ontario and Quebec are received and filled at the Central Farm, Ottawa, and the details of this distribution will be found in the report of the Dominion Cerealist, who has supervision of this work.

In addition to the samples sent out from the Central Farm, amounting in all to 13,473, there were distributed from the branch Farms and Stations the following numbers of samples of potatoes:—

Experimental Station, Charlottetown, P.E.I.		93
"	Farm, Nappan, N.S.	260
"	Farm, Brandon, Man.	115
"	Farm, Indian Head, Sask.	340
"	Station, Lethbridge, Alta.	430
"	Station, Lacombe, Alta.	1,009
"	Farm, Agassiz, B.C.	763
		3,010
Total.		

The total number of samples distributed from the Central and branch Farms for the year is thus seen to be 16,483.

In addition to this free distribution of small samples, the surplus grain grown on the Experimental Farms, not required for sowing the next year, is sold to farmers in lots of from two to six bushels each. The demand for this seed is always much larger than the supply.

NEW BUILDINGS.

During the year, a number of new buildings have been erected on the Central Farm. Among the more important are a Cerealist building, an Auditorium, an Insectary and a Pumphouse and accessories.

The Cerealist building has been designed and built to accommodate under one roof and in suitable quarters the various lines of work under the immediate supervision of the Dominion Cerealist. Of these lines, the more important are the distribution of seed grain and potatoes, wheat milling and the storage of varietal test plot and breeding plot crops.

The Auditorium has been built with a view to provide a suitable place for large gatherings or excursions. It will seat about 700 people. It includes, besides the main hall, a kitchen and a small hall. Provision has been made to do something towards supplying farmers or excursionists with refreshments, and tables sufficient to seat over 400 at a meal at one time can be set up. A judging ring can be easily divided off from the rest of the building, and a good live stock demonstration platform has been erected. It is hoped that this building will enable us to do much more in the way of direct instructional work to farmers within a reasonable radius of Ottawa.

The Insectary has been designed to provide conveniences for the breeding and studying of insects under conditions as nearly approaching the normal for them as climatic conditions at Ottawa will permit.

The water supply for the Farm buildings and houses, as well as for buildings belonging to other Departments but located on the Central Farm, is drawn from the city mains For a number of years this supply has been steadily falling off until, some three years ago, it was found necessary to install a small booster pump. After a few months' experience, it became evident that some more effective system must be devised. In the autumn of 1911, accordingly, a more powerful pump was placed in a house built especially for its accommodation and located at the point where the city water crosses the Farm boundary. A large steel water-storage tank, 30,000 gallons in capacity, was at the same time built on a tower 80 feet high, on the highest point of the Central Farm. This new system has proven eminently satisfactory.

MEETINGS AND CONVENTIONS.

I have, as usual, found time to attend a number of conventions or agricultural meetings during the year.

Among the more important of these might be mentioned Prescott and Russell Counties Teachers' Convention, Hawkesbury, Ont.; Ontario Fat Stock and Poultry Show, Guelph, Ont.; Eastern Ontario Fat Stock and Poultry Show, Ottawa, Ont.; Nova Scotia Farmers' Association, Yarmouth, N.S.; National Live Stock Convention, Ottawa, Ont.; Live Stock Conventions, Toronto, Ont.; Western Ontario Dairymen's Convention, Ingersoll, Ont.; Eastern Ontario Dairymen's Convention, Campbellford, Ont.; National Seed Growers' Association Convention, Ottawa, Ont.; Prince Edward Island Seed Growers' Convention, Charlottetown, P.E.I., and the Ontario Corn Growers' Convention, Tilbury, Ont.

One and, in some cases, four or five addresses or lectures were delivered at each of the above meetings.

VISITS TO BRANCHES.

My official duties as Director and Acting Dominion Agriculturist have necessitated my visiting each of the various Experimental Farms and Stations during the year. To certain Farms or Stations, I have found it necessary to make several visits. These journeys have taken up a very considerable amount of time, but are, of course, necessary to the proper conduct of the system.

ADDITIONS TO AND CHANGES IN THE STAFF.

Mr. Thos. A. Sharpe, Superintendent of the Experimental Farm at Agassiz, B.C., from its establishment in 1888, to March 31, 1911, retired from that position on the latter date to assume the management of his own farm at Salmon Arm, B.C.

Horticultural work was one of the chief features of the Agassiz Farm under Mr. Sharpe's superintendency and his careful testing of varieties of fruits, vegetables, flowers, trees and shrubs, together with the very complete records taken in each case, must be considered as having very materially assisted in the development of horticulture in British Columbia.

Mr. Sharpe's farm at Salmon Arm is devoted mainly to fruit-culture and arrangements have been made whereby he reports from time to time to the Department on his work there, so that the benefits of his experience along horticultural lines will still be available to the public.

The vacancy caused by the resignation of Mr. Thos. A. Sharpe, Superintendent of the Experimental Farm at Agassiz, B.C., was filled by the appointment of Mr. P. H. Moore, B.S.A., to that position.

Mr. Moore was born and brought up on a dairy farm in Nova Scotia. He took a dairy school course at the Agricultural College, Truro, N.S., and then spent two seasons on the road in Nova Scotia with a travelling dairy. He spent two years at the Truro Agricultural College proceeding thence to the Ontario Agricultural College, Guelph, to complete the studies necessary for the degree of B.S.A. On graduating, he spent a year at the South Dakota Experiment Station and Agricultural College and from that institution went to British Columbia as Dairy Inspector, which work he left to take the position he now occupies.

Miss Faith Fyles, B.A., Assistant Botanist, is the daughter of the Rev. Dr. Fyles, F.L.S. Miss Fyles was educated at King's Hall, Compton, where she graduated with honours, obtaining the medal and special prizes in botany and other subjects. She entered college with a first-class scholarship and, after a successful four-years' course, obtained the degree of B.A. from McGill University.

She spent the next year in studying the flora of Quebec with her father and, at the same time, in taking a course of drawing in colour from the well-known artists Mr. Robert Wickenden and Mr. Walter Griffin, then holding classes at the Quebec Studio Club, of which Miss Fyles was a member.

After six years' experience in teaching in Dunham Ladies' College and the Bishop Strachan School, she spent a year in travel and study in Europe.

She entered the government service as Assistant Seed Analyst in 1909, and was transferred to the Experimental Farm staff in 1911.

Mr. J. W. Eastham, B.Sc., Chief Assistant Botanist, was born in Liverpool, England, in 1879. His technical training was acquired at the Lancashire School of Agriculture in 1894-6, and at the University of Edinburgh in 1896-9, from which latter institution he graduated in 1899, with the degree of B.Sc., with 'Special Distinction' in Botany. For two years he occupied the position of assistant in the Department of Chemistry of Edinburgh University, which work he left to become lecturer in biology at the Cheshire College of Agriculture, where he remained until 1906. From 1906 to 1911 he was lecturer in botany at the Ontario Agricultural College, Guelph. During this period he spent a year's leave of absence in post-graduate work at Cornell University, in the Departments of Plant Pathology and Plant Physiology.

He resigned his position at the Guelph Agricultural College to take his present appointment.

Mr. J. M. Swaine, M. Sc., Assistant Entomologist, was born in 1879 at Barrington, N.S. He received his elementary training in Yarmouth Academy, and the Nova Scotia Normal School at Truro. He taught school for four years and then spent two years as assistant in the Agricultural College at Truro.

He graduated from Cornell University in 1906, having specialized in entomology and zoology, receiving the degree of M.Sc. in A.

During the years 1906-7, he was assistant in entomology and zoology at Cornell, which position he left to become lecturer in entomology and zoology at Macdonald College, Que. He filled this position until he accepted an appointment to the staff of the Dominion Experimental Farms, in 1911.

Mr. F. E. Buck, B.S.A., Assistant to the Dominion Horticulturist, was born at Colchester, England, in 1875. He received his early education at private schools in that city. As a youth, he received considerable training in fruit growing and general horticultural methods under his father's direction.

Coming to Canada in 1903, he spent the following year at Mount Hermon College, in Massachusetts, where he took a special course in forestry and landscape gardening. For two years he filled the position of campus superintendent of a seventy-acre college campus, and later planned and executed various pieces of private landscape work in the State of New York.

Parts of the years 1907 and 1908 he spent at Cornell University, taking special courses in horticulture, plant diseases, etc., and later on, in 1908, he entered Macdonald College of McGill University, taking a four-year course in three years, specializing in floriculture and landscape gardening, offering his thesis in work relating to the latter. He received his degree of B.S.A. in 1911.

While at college and during the summer recesses, he was engaged one year to plan and plant the ornamental grounds of Macdonald College.

Upon the completion of his course, he was appointed to his present position.

The position of Assistant to the Superintendent of the Experimental Station at Lethbridge, Alta., was filled in June, 1911, by the appointment of F. S. Grisdale, B.S.A.

Mr. Grisdale was born at Ste. Marthe, Que., in 1887. He pursued his early studies in the public schools of Quebec, and entered Macdonald College as one of the agricultural students in the opening year of that institution, 1907. He took the four-

year course in agriculture, graduating with the degree of B.S.A. from McGill University in 1911, having taken the agriculture and live stock option.

ACKNOWLEDGMENTS.

For the efficient performance of duty and willing co-operation in all Divisions, my thanks are due the different members of the staff, both at Ottawa and at the various branch Farms. This being my first year as Director, I feel deeply grateful for the loyal support of officers of all Divisions and at all the branch Farms. The large measure of confidence accorded and the kind sympathy shown have rendered comparatively easy and pleasant of performance, duties otherwise exceedingly strenuous and difficult of fulfilment.

To Mr. O. C. White, Assistant in Field Husbandry and to Mr. D. D. Gray, Farm Superintendent, I am especially indebted for particular care and untiring energy in carrying on live stock and cultural work on the Central Farm, Ottawa.

To my Assistant, Mr. F. W. Patterson and to my Secretary, Mr. M. C. O'Hanly, my sincere thanks are due for invaluable assistance given me in my executive duties and for the most satisfactory manner in which their work has invariably been done.

REPORT OF THE (ACTING) DOMINION AGRICULTURIST

J. H. GRISDALE, B. AGR.

The following report of the Agriculturist's work on the Central Farm has been prepared under my supervision by Mr. O. C. White, Assistant to the Dominion Agriculturist, aided by Mr. D. D. Gray, Farm Superintendent.

Therein will be found reports on the horses and upon the breeding and feeding operations with beef cattle, dairy cattle, sheep and swine upon the Central Farm, as well as a detailed account of the cultural and rotation work under way here during the past season.

LIVE STOCK.

The live stock now (April 1, 1912) under my charge includes horses, cattle, sheep and swine.

HORSES.

The horses are kept for labour purposes exclusively, no breeding whatever being done.

They are eighteen in number made up at present of:—

14 heavy horses of Clydesdale and Percheron blood.
3 heavy driving horses.
1 light driver.

CATTLE.

There are in all 127 head in the stables, made up of 97 pure-breds, 1 Canadian grade cow and 29 fatteening steers. The pure-breds are kept for experimental breeding and feeding work, and steers are used experimentally to determine cost of production under different conditions, and with various food-stuffs.

Pure-bred Breeding Cattle.

Holsteins—Twelve, including 9 females and 3 males.
Ayrshires—Thirty-four, including 31 females and 3 males.
Guernseys—Twenty, including 18 females and 2 males.
Jerseys—Six, including 5 females and 1 male.
French-Canadians—Twenty-five, including 19 females and 6 males.

Steers.

Twenty-nine pure-bred and grade steers are under feed at present, representing the Shorthorn, Angus, Galloway and Hereford breeds.

SHEEP.

There are now 59 sheep in the pens, made up of 39 pure-bred Shropshires and 20 pure-bred Leicesters.

The Shropshires include 1 ram, 13 mature ewes, 3 shearling ewes and 22 spring lambs.

The Leicesters include 1 ram, 7 mature ewes, 4 shearling ewes and 8 spring lambs.

SWINE.

193 swine are on hand, made up of 109 Yorkshires, 43 Berkshires and 41 Tamworths.

The Yorkshires include two stock boars, 26 brood sows, 5 young sows, 60 young pigs and 16 feeders.

The Berkshires include 2 stock boars, 14 brood sows, and 27 young pigs.

The Tamworths include 1 stock boar, 16 brood sows, 4 young sows and 20 young pigs.

HORSES.

The work of the horses includes the regular farm operations of the Agricultural Division, work for the Horticultural, Cereal, Poultry and Botanical Divisions, cartage in connection with all the Divisions, road making and messenger service.

HORSE LABOUR.

During the year, from April 1, 1911, to March 31, 1912, the work done by the horses kept in the stables here was equivalent to 5,379·6 days' work, distributed as follows:—Live stock, hauling feed, marketing stock, etc., 147 days; farm work '200-acre farm' 903 days; manure on '200-acre farm' 409 days; Horticultural Division, 780·4 days; Cereal Division, 671 days; Poultry 24·6 days; bulletins and reports from and to farm offices, 48·9 days; delivery of milk, 46·8 days; lawns, 118·5 days; omnibus service, including one horse for omnibus, two horses for general driving and one horse for supervision of work, 1,456 days; care of roads on farm, 27·5 days; various, including work about outbuildings, sidewalks, exhibitions, etc., 746·9 days.

DAIRY CATTLE.

During the year Holsteins and Jerseys have been added to our list of breeds kept and the entire herd of dairy Shorthorns has been transferred to the Dominion Experimental Farm, Brandon.

SUMMER FEEDING.

Relative to the number of cows, the available pasture here is very small so that we depend for the most part upon soiling crops and corn silage for summer feed. Corn silage was fed in considerable quantities all summer long, and except for the few weeks that they were on full pasture, green feeds were cut and fed in the stable, or in the pasture field, clover and alfalfa, and mixed peas and oats constituting the supply.

During the early part of the summer the cows were let out in the field in the daytime and stabled at night, but as the flies became troublesome they were housed during the day and given the freedom of the field at night.

WINTER FEEDING.

The winter ration has been on the average about as follows:—

Hay (mixed clover and timothy)	6 lbs.
Corn silage	30 "
Roots (mangels and turnips)	10 "
Straw (oat)	4 "
Meal (usually consisting of a mixture of 800 lbs. bran 300 lbs. gluten and 200 lbs. of oil cake or cotton seed cake).	7 "

The meal is scattered on the roughage mixture of roots, ensilage and cut straw after it is before the cattle. The hay is fed uncut, after the other material is eaten up. Water is before them all the time. Salt is added to their roughage at the time it is being mixed and rock salt is placed in the mangers of those cows that seem to require more than the average quantity.

DAIRY HERD RECORDS.

The dairy cow milk records are reported upon by lactation periods rather than according to the fiscal year, as has previously been done. This change seemed advisable in that a cow's merits are usually calculated on a basis of her production per lactation period.

In the case of heifers with first calves, charges for feed include the consumption from a date two months previous to parturition to the time of being dried. In the case of all following lactation periods the feed charges cover a time from drying to drying.

In estimating the cost of feeding the following values were used.

Pasture, per month	$ 1 per cow.
Meal mixture	25 per ton.
Clover hay	7 "
Straw	4 "
Roots and ensilage	2 "
Green feed	3 "

In calculating the value of the product, 28 cents per pound is allowed for the butter and 20 cents per 100 lbs. for the skim milk. The butter sold at from 25 cents to 40 cents per pound.

In computing these returns the bedding, and the labour in connection with caring for the cows and manufacturing the butter have not been taken into account, nor have they been credited with the manure made.

All cows are reported upon that have finished a lactation period within the dates of the fiscal year 1911-1912, except a few Holsteins and Jerseys that were bought, and whose records previous to the time of purchase were not obtainable. This list does not of course include all cows that are at present in milk, as many are heifers not far advanced in their first lactation period.

Names of Cows.	Age at beginning of Lactation Period.	Date of Dropping Calf.	Number of days in Lactation Period.	Total pounds of Milk for Period.	Daily average Yield of Milk.	Average per cent Fat in Milk.	Pounds of butter produced in Period.	Value of Butter at 28c per lb.
Flavia 2nd of Ottawa.....A.	5	Jan. 6, '11....	267	9,364	35·1	4·42	486·61	136·25
Marjorie (imp. in dam).....A.	12	Mar. 20, '11 ...	377	10,487	27·8	3·86	477·01	133·56
Inoquette..... C.	7	" 11, '11....	302	8,292	27·50	4·40	429 09	120·14
Alma.....G.G.	11	Aug. 15, '10....	319	7,951	24·9	5·55	441·18	123·53
Pearly Prize.....G.	5	Mar. 15, '11....	302	6,816	22·6	5·41	433 75	121·45
Marjorie 2nd of Ottawa .....A.	4	Sept. 5, '10....	329	8,430	25 60	4·39	435·60	121·97
Denty 4th of Ottawa.....A.	4	Mar. 21, '11....	244	7,839	32 20	4·19	387·05	108·37
Ottawa Itchen.....G.	5	Nov. 25, '10....	309	6,842	22·10	5·05	406·48	113·81
Fannie.....G.C.	6	Feb. 8, '10....	593	9,176	15·50	4·39	474 08	132·74
Aromaz.....C.	3	Mar. 28, '11...	305	6,769	22·2	5·35	362·40	101·47
Maggie 10th of Culcaigre.....A.	12	June 4, '10....	470	11,272	24·0	3·50	464·08	129·94
Fortune 4ème d'Ottawa.....C.	4	Apr. 17, '11....	286	7,462	26·10	4·06	3 6·81	99·91
Fortune Precoce.....C.	4	Mar. 6, '11....	269	6,639	24·70	4·37	341·44	95·60
Duchesse 5ème .....C.	3	Dec. 29, '10....	262	6,420	24·50	5·12	328·76	92·05
Rejane 2ème d'Ottawa.....C.	4	Nov. 21, '10....	320	5,333	16 70	5·14	322·55	90·31
Flavia 3rd of Ottawa.....A.	3	Feb. 13, '11....	307	6,776	22·1	3·90	315·53	88·34
Inoquette 3ème.....C.	3	Apr. 11, '11....	261	4,803	18·40	4·67	264 27	73·99
Soncy R.....A.	5	Nov. 15, '10....	258	5,200	20·10	4·18	256·00	71·68
Zamora.....C.	14	Nov. 13, '10 ...	319	4,792	15·0	5·01	282·54	79·11
Denty 11th of Auchenbrain.....A.	11	July 2, '10....	412	8,167	18·5	3·79	364 06	101·93
Ottawa Kate.....A.	5	Dec. 23, '10 ...	281	5,644	20·09	4·01	266·61	74·65
Jessie D. of Ottawa.....A.	5	Apr. 28, '11....	273	5,905	21·6	4·51	266·27	74·55
Marjorie 4th of Ottawa.....A.	2	Nov. 17, '10....	256	5,062	19·8	3·89	237·59	66·52
Clarenda.....G.A.	3	Mar. 28, '11...	173	4,556	26·3	4·96	218·93	61·30
Maggie Pulchrae .....A.	2	Dec. 3, '10....	419	6,552	15·6	3·91	305·65	85·58
Itchen's Pride.....G.	2	Feb. 14, '11....	297	4,921	16·5	4·68	270 68	75·79
Jessie E. of Ottawa.....A.	3	Aug. 30, '10....	270	5,373	19·90	3·83	242·06	67·77
Deanie 2nd.....G G.	2	Feb. 14, '11....	215	4,780	22·2	4·94	236·34	66·17
Archer's Pearl.....G.	2	Feb. 1, '11....	297	4,148	14·00	5·00	243·91	68·29
Queenie 2nd.....G.G.	2	Oct. 21, '11....	328	4,739	14·40	5·01	279·11	78·15
Soncy of Nappan.....A.	4	Mar. 28, '10....	510	8,165	16·00	3·52	338·06	94·65
Archer's Spot.....G.	2	Dec. 27, '10....	277	4,153	15 0	4·69	228·98	64·11
Dona Clatina.....G.	3	Sept. 14, '10....	259	3,083	11·9	5·36	194·34	54·41
Soncy 3rd of Ottawa .....A.	2	Sept. 21, '10....	282	3,601	12·8	4·00	169·46	47·44
Duchesse Perdue.....C.	4	June 22, '11....	218	3,536	16·22	3·96	164·90	46·17
Zaza Fille .....C.	2	Mar. 2, '11....	301	3,650	12·1	5·25	191·62	53·65

Value of Skim Milk at 20c. per cwt.	Total Value of Product.	Amount of Meal Eaten at 1½c per lb.	Amount of Roots and Ensilage eaten at $2 per ton.	Amount of Hay Eaten at $7 per ton.	Amount of Green Feed Eaten at $3 per ton.	Amount of Straw Eaten at 20c per cwt.	Months on Pasture at $7 per month.	Total cost of Feed for period.	Cost to produce 100 lbs. of Milk.	Cost to produce 1 lb. of Butter, skim milk neglected.	Profit on 1 lb. Butter, skim milk neglected.	Profit on Cow during period, labour neglected.
17·75	154·00	2,158	12,719	1,694	2,420	1,050	4	55·34	59·1	11·4	16·6	98·6
20·02	153·58	2,654	16,367	2,324	2,300	1,145	4	67·41	64·2	14·1	13·9	86·1
15·73	135·87	2,013	11,621	1,461	2,570	780	4	51·30	61·9	12·0	16·0	84·5
15·02	138·55	2,252	11,267	1,747	3,900	1,187	4	57·74	72·6	13·1	14·9	80·8
12·76	134·21	2,228	12,303	1,622	2,340	837	4	55·00	80·7	12·7	15·3	79·2
15·99	137 96	2,362	13,520	1,680	1,520	1,433	6	60·06	71·2	13·8	14·2	77·9
14·90	123·27	1,845	10,847	1,311	2,430	723	4	47·57	60·7	12·3	15·7	75·7
12·87	126.68	1,937	11,667	1,654	2,280	1,023	4	51·12	74·7	12·6	15·4	75·5
18·09	150·83	2,938	18,514	2,055	2,250	1,407	8	76·60	83·5	16·2	11·8	74·2
12·81	114·28	1,904	10,681	1,433	2,369	715	4	48·47	71·6	13·4	14·6	65·8
21·60	151·54	3,425	16,163	1,897	6,480	1,643	7½	86 11	76·4	18·5	9 5	65·4
14·21	114·12	2,023	11,120	1,333	2,250	733	4	49·90	66·9	13·9	14·1	64·2
12·59	108·19	1,957	10,150	1,171	2,270	628	4	47·35	71·3	13·9	14·1	60·8
12·18	104·23	1,987	11,445	1,820	2,020	1,030	3	50·74	79 0	15·4	12·6	53·4
10·02	100·33	1,970	11,755	1,700	2,250	1,018	4	51·72	97·0	16·0	12·0	48·6
12·92	101·26	2,127	12,214	1,775	2,290	836	4	54·11	79·8	17·1	10 9	47·1
9·08	83 07	1,501	8,500	918	2,230	543	4	38·90	81·0	14·7	13·3	44·1
9·88	81·56	1,488	9,032	1,625	1,520	765	2	39·12	75·2	15·3	12·7	42·4
9·02	88·13	1,739	9,949	1,422	2,281	944	4	45·96	95·9	16·3	11·7	42·1
15·60	117·53	2,736	16,639	1,947	6,270	1,675	6	76·39	93·5	21·0	7·0	41·1
10·76	85·41	1,732	9,820	1,184	2,290	837	4	44·71	79·2	16·8	11·2	40·7
11·23	85·83	1,720	11,334	1,418	2,340	752	4	46 80	79·3	17·6	10·4	39·0
9·65	76·17	1,410	9,401	1,437	1,520	928	2	38·18	75·4	16·1	11·9	37·9
8·66	69 96	1,255	7,145	714	2,260	615	3½	33·45	73·5	15·3	12·7	36·5
12·49	98·07	2,364	14,631	2,202	2,270	1,154	4	61·60	94·0	20·2	7·8	36·4
9·30	85·09	1,954	11,140	1,500	2,240	760	4	49·69	101·0	18·3	9·7	35·4
10·26	78·03	1,589	9,935	1,684	890	1,014	4	42·91	79·9	17·7	10·3	35·1
9·09	75·26	1,433	9,247	1,152	2,227	809	4	40·15	84·0	17·0	11·0	35·1
7·81	76·10	1,695	8,465	1,416	2,256	686	4	43·35	104·5	17·7	10·3	32·7
8·92	87·07	2,129	11,967	1,650	2,107	1,163	5½	55·26	116·6	19·8	8·2	31·8
15·65	110·30	3,063	15,281	1,911	6,180	1,363	6½	78·74	96·4	23 3	4·7	31·5
7·85	71·96	1,548	9,760	1,212	2,240	792	4	42·29	101·8	18·5	9·5	29·6
5·79	60·20	1,509	7,687	1,528	.....	723	1	34·32	111 3	17·7	10·3	25·8
6·86	54·30	1,503	8,605	1,512	900	839	3	38·71	107·5	22·8	5·2	15·5
6·74	52·91	1,411	8 750	955	2,250	547	4	38·18	108·0	23·2	4·8	14·7
6·92	60·57	1,701	11,509	1,462	2,287	702	4	46·70	127·9	24·4	3·6	13·8

DAIRY COW RECORDS.

The supplying of forms whereon to record the milk produced or the feed consumed by individual cows in the herd is being continued. Upon application to the Dominion Animal Husbandman any of the following kinds of form will be sent free of cost.

Month long—Daily milk records suitable for herds numbering up to twenty-two cows.

Week long.—Daily records for herds of sixteen cows.

Week long.—Daily records for herds of twenty-four cows.

Monthly summary records.

Yearly summary records.

Feed record forms.

Too much importance cannot be placed upon the value of adopting some method of learning the actual production of each cow in milk, and the forms above mentioned are a convenience to this end that is being utilized by an increasing number of our dairymen every year.

BELF PRODUCTION.

A number of steers have been fed and marketed during the year. The work has not been of a comparative nature, but the net returns from the different lots are instructive as to the profits or losses likely to result from certain methods followed.

Following is a detailed record of the different lots fed.

Lot 1.

These were Shorthorn steers purchased and placed on test when slightly over one year of age. They had been highly fed, and at the beginning of the test were in a finished condition. At the actual purchase and sale prices the resultant gains were not sufficient to compensate for the feed they consumed. Had the difference between purchase and sale prices been 1¼ cents per pound, there would have been a profit of only 86 cents each. The extremely hot summer of 1911 was not conducive to rapid gains, especially with stall-fed animals.

Number of steers in lot		2
First weight, gross, January 28, 1911	lbs.	2,040
First weight, average	"	1,020
Finished weight, gross, January 13, 1912	"	2,870
Finished weight, average	"	1,435
Total gain in 350 days	"	830
Average gain per steer	"	415
Daily gain per steer	"	118
Daily gain per lot, 2 steers	"	237
Gross cost of feed	$	102 01
Cost of 1 lb. gain	cts.	12·29
Value of beef, January 28, 1911—2,040 lbs. at 8 cents per lb	$	163 20
Total cost to produce beef	$	265 21
Selling price 2,870 lbs. at $8.50 per 100 lbs., less 5 per cent	$	231 76
Loss	$	33 45
Loss per steer	$	16 72
Average valuation per steer to start	$	81 60
Average value price per steer at finish, January 13, 1912	$	115 88
Average increase in value	$	34 28
Average cost of feed per steer	$	51 00

Amount of meal eaten per lot of 2 steers	lbs.	4,338
Amount of ensilage and roots eaten	"	16,020
Amount of hay eaten	"	2,968
Amount of straw eaten	"	1,395
Amount of green feed eaten	"	2,940

Meal consisted of bran 2,716·2 lbs.; gluten 1,276·4 lbs.; oil cake, 995·4 lbs. Roughage was clover hay, corn ensilage, turnips, mangels and oat straw. Roots were fed during the winter months only, and in varying proportions with the ensilage.

Lot 2.

These Shorthorn steers were dropped in June, 1909, and were practically ready for market in the spring of 1911, but were held to be fed as 'kept over steers.' The result was what we had expected. Though they sold at a high figure there was a net loss for the 'kept over' year of $2.76 each. Had they been sold the previous spring they would have yielded a reasonable profit.

Number of steers in lot		3
First weight, gross, April 1, 1911	lbs.	3,525
First weight, average	"	1,175
Finished weight, gross, January 13, 1912	"	4,500
Finished weight, average	"	1,500
Total gain in 288 days	"	975
Average gain per steer	"	325
Daily gain per steer	"	1·13
Daily gain per lot, 3 steers	"	3·39
Gross cost of feed	$	142 53
Cost of 1 lb. gain	cts.	14·6
Value of beef April 1, 1911—3,525 lbs. at $6.50 per 100 lbs.	$	229 12
Total cost to produce beef		371 65
Selling price,—4,500 lbs. at $8.50 per 100 lbs., less 5 per cent.		363 38
Loss		8 27
Loss per steer		2 76
Average valuation per steer to start		76 37
Average value price per steer at finish, January 13, 1912.		121 12
Average increase in value		44 75
Average cost of feed per steer		47 51
Amount of meal eaten per lot of 3 steers	lbs.	6,963·5
Amount of ensilage and roots eaten	"	24,080
Amount of hay eaten	"	4,554
Amount of straw eaten	"	2,092·5
Amount of green feed eaten	"	4,340

Meal consisted of bran 3,929 lbs.; gluten, 1,795 lbs.; oil cake, 1,239 lbs. Roughage was clover hay, corn ensilage, turnips, mangels and oat straw. Roots were fed during the winter months only and in varying proportions with the ensilage.

Lot 3.

This lot of seven Angus steers averaged about the same age as lot 2 Shorthorns, and like them were ready for the block in the spring of 1911, when they might have been disposed of at a profit. The average loss of 6 cents per steer for the 'kept over' year indicates what may be expected by holding animals over after they have once reached market weight and condition, and points to the advisability of rapid feeding and early marketing.

Number of steers in lot		7
First weight, gross, April 1, 1911	lbs.	8,535
First weight, average	"	1,219·3
Finished weight, gross, January 13, 1912	"	1,080·5
Finished weight, average	"	1,543·5
Total gain in 288 days	"	2,270
Average gain per steer	"	324·3
Daily gain per steer	"	1·12
Daily gain per lot 7 steers	"	7·84
Gross cost of feed	$	318 14
Cost of 1 lb. gain	cts.	14
Value of beef, April 1, 1911, 8,535 lbs. at $6.50 per 100 lbs.	$	554 77
Total cost to produce beef		872 91
Selling price 10,805 lbs. at $8.50 per 100 lbs. less 5 per cent		872 50
Loss	cts.	41
Loss per steer	"	6
Average valuation per steer to start	$	79 25
Average value price per steer at finish		124 64
Average increase in value		45 39
Average cost of feed per steer		45 45
Amount of meal eaten per lot of 7 steers	lbs.	15,066
Amount of ensilage and roots eaten	"	53,514
Amount of hay eaten	"	12,517
Amount of green feed eaten	"	8,414
Amount of straw eaten	"	4,754

Meal consisted of bran 8,488·5 lbs.; gluten 3,906·5 lbs.; oil cake 2,671 lbs. Roughage was clover hay, corn ensilage, turnips, mangels and oat straw. Roots were fed during the winter months only and in varying proportions with the ensilage.

Lot 4.

The steers in this lot were yearlings of Angus breeding, and when put on feed in November, 1911, were in comparatively poor flesh, but thrifty. They were not heavily fed and were marketed in November, 1912 in fair condition.

Number of steers in lot		3
First weight, gross, November 30, 1911	lbs.	2,640
First weight, average	"	880
Finished weight, gross, March 29, 1912	"	3,410
Finished weight, average	"	1,136·6
Total gain in 141 days	"	770
Average gain per steer	"	256·6
Daily gain per steer	"	1·82
Daily gain per lot 3 steers	"	5·46
Gross cost of feed	$	54 81
Cost of 1 lb. gain	cts.	7·1
Value of beef November 9, 1911,—2,640 lbs. at 5½ cents.	$	145 20
Total cost to produce beef		200 01
Selling price 3,410 lbs. at 6¾ cents per lb. less 5 per cent shrinkage		218 67
Profit		18 66
Profit per steer		6 22
Average valuation per steer to start		48 40

Average value price per steer at finish, March 29, 1912	72 89
Average increase in value	24 49
Average cost of feed per steer	18 27
Amount of meal eaten per lot of 3 steers ..lbs.	2,493
Amount of ensilage and roots eaten "	9,795
Amount of hay eaten "	2,805
Amount of straw eaten "	1,400

SHEEP.

We have to report just a fair year with the breeding sheep. The crop of lambs in the spring was good, and until midsummer both sheep and lambs were in the best of thrift. They were necessarily limited to a small acreage of pasture, and this proved their undoing. They became infested with tape worms, and though they were promptly treated for same, it left them in a greatly reduced condition, and very considerably diminished our returns for the year.

We had thought, and so reported, that the adoption of a short rotation might enable us to continue our flocks with fair success, but last year's experience seems to demonstrate the futility of trying to raise sheep with any degree of profit on such a small pasture area as has heretofore been available.

EXPERIMENT IN FATTENING LAMBS.

To determine the relative value of roots and corn silage as a succulent feed for fattening lambs, a third experiment similar in outline to those conducted in 1910 and 1911, has been carried on.

Grade wethers of mixed breeding were used, which when put on feed in December were about seven months of age.

They were divided into three lots of ten in each lot.

For two weeks they were all fed on clover hay only at the rate of three pounds per head per diem.

After this preparatory period the feeding was as follows:—

Each lamb of each lot received 8 ozs. per diem during the first week and gradually increasing amounts up to 22 ozs. per diem during the fourteenth week of a meal mixture constant in composition: 400 lbs. bran, 200 lbs. oats and 100 lbs. nutted oil cake.

As roughage, lot 1 were given turnips, lot 2 ensilage and lot 3 turnips and ensilage, equal parts, and of clover hay each lamb in each lot received 1½ lbs. per day.

It was aimed to feed as much turnips and ensilage as the animals would consume without inducing scouring. Seven pounds per lamb per diem was the maximum quantity of turnips and of the mixture of turnips and ensilage, consumed, whereas five pounds of ensilage per lamb per diem was as much as they would eat up clean.

All lambs remained in good health throughout the test, but one animal in lot 2 had some trouble with its teeth, which so affected its progress that it was decided to leave it out of consideration in computing the results.

In calculating the cost of feeding the following prices were charged:—

	per ton.
Roots and ensilage	$ 2 00
Clover hay	7 00
Bran	22 00
Oats	25 00
Nutted oil cake	35 00

TABLE 1.—Lamb Feeding Experiment.

(Turnips *vs.* Corn Ensilage *vs.* Turnips and Corn Ensilage as Succulent Feed for Fattening Lambs).

Lot.		No. 1.	No. 2.	No. 3.
Numbers of lambs in lot		10	9	10
Number of days in experiment		114	114	114
Total weight at beginning of experiment	Lbs.	1,033	912	1,033
Total weight at end of experiment	"	1,355	1,195	1,376
Gain during period	"	322	283	343
Gain per head	"	32·2	31·4	34·3
Gain per head per day	"	·28	·27	·30
Quantity of meal eaten by lot during period	"	1,085	976·5	1,085
Quantity of clover-hay eaten by lot during period	"	1,768	1,591	1,768
Quantity of turnips eaten by lot during period	"	6,300	.....	3,150
Quantity of corn ensilage eaten by lot during period	"	.....	4,063	3,150
Total cost of feed	$	25.89	21.69	25.89
Cost of feed per head	"	2.59	2.41	2.59
Cost of feed per head per day	Cts.	2·27	2·11	2·27
Cost to produce one pound gain	"	8·04	7·66	7·55
Original cost of sheep	$	59.40	52.44	59.40
Original cost of sheep plus cost of feed	"	85.29	74.13	85.29
Selling price at $7.25 per 100 lbs	"	98.24	86.63	99.76
Net profit on lot	"	12.95	12.51	14.47
Net profit per lamb	"	1.29	1.39	1.45

Lamb Feeding Experiment.

(Average result of three tests of Turnips *vs.* Corn Ensilage *vs.* Mixture of Turnips and Ensilage as Succulent Feed for Fattening Lambs).

Group.		No. 1.	No. 2.	No. 3.
Number of lambs in group		28	27	29
Average number of days in the experiment		109	109	109
Total weight at beginning of experiment	Lbs.	2,886	2,766	2,887
Total weight at end of experiment	"	3,673	3,574	3,722
Gain during period	"	787	808	835
Gain per head	"	28·1	29·9	28·8
Gain per head per day	"	·26	·27	·26
Quantity of meal eaten by group during period	"	3,064	2955·5	3,167
Quantity of turnips eaten by group during period	"	13,257	.....	7,196
Quantity of corn ensilage eaten by group	"	145	9,725	6,538
Total cost of feed	$	69.45	62.87	70.13
Cost of feed per head	"	2.48	2.33	2.42
Cost of feed per head per day	Cts.	2·27	2·14	2·23
Cost to produce one pound gain	"	8·82	7·78	8·40
Original cost of sheep	$	163.96	157.05	164.62
Original cost of sheep plus cost of feed	"	233.41	219.92	234.15
Selling price	"	269.34	262.30	273.02
Net profit on lot	"	35.93	42.38	38.87
Net profit per lamb	"	1.28	1.57	1.34

The figures in the above tables indicate corn ensilage to be of high value for fattening lambs, the average net profit per lamb covering three years' experiments being $1.28 for the turnip-fed lots as against $1.57 for the lots getting silage, and $1.34 for the lots on a mixture of turnips and ensilage.

TABLE 2.—Lamb Feeding Experiment.

(Some findings in connection therewith).

Lot.	No. 1.	No. 2.	No. 3.
Meal required to produce one pound increase in live weight..... Lbs.	3·37	3·45	3·16
Hay (clover) " " " ..... "	5·49	5·62	5·15
Roots (turnips) " " " ..... "	19·57	.....	9·18
Ensilage (corn) " " " ..... "	.....	14·36	9·18
Dry matter " " " ..... "	8·71	10·43	9·55
Digestible matter " " " ..... "	6·05	6 67	6·32
Nutritive ratio of meal ration	1:3·8	1:3·8	1:3·8

SWINE.

SUMMARY OF PIGGERY OPERATIONS, 1911-12.

Total sales during year..	$ 3,200 27	
Value of manure produced..	200 00	
Value of pigs on hand, April 1, 1912..	4,407 25	
		$7,807 52
Cost of feed and bedding during year..	$ 2,206 40	
Cost of labour..	970 00	
Value of stock on hand April 1, 1911..	4,371 20	
		7,547 60
Profit for one year..		$ 259 92

PIG FEEDING EXPERIMENTS.

Meal *vs.* meal and milk *vs.* meal and pulped turnips cooked. *vs.* meal and pulped turnips raw *vs.* meal and pulped mangels raw.

In this comparison of feeds for fattening swine, two tests were made, the first being the average of a triplicate test with five lots of five in each lot, and extending over a period of 56 days, the second comprising five lots of five in each lot, and extending over a period of 112 days.

The meal mixture was made up of:—

200 lbs. ground barley.
200 lbs. shorts.
100 lbs. ground oats.

and in each case was mixed, equal parts, with the other ingredient of the ration.

In both tests the different lots were fed as follows:—

Lot 1.—Meal mixture and water only.
Lot 2.—Meal mixture and milk.
Lot 3.—Meal mixture and pulped turnips, cooked.
Lot 4.—Meal mixture and pulped turnips, raw.
Lot 5.—Meal mixture and pulped mangels, raw.

In computing results foodstuffs were charged for at the following rates:—

Meal mixture..	$ 1 20 per 100 lbs.
Skim-milk..	0 20 per 100 lbs.
Mangels and turnips..	2 00 per ton.

The following tables contain the details of the experiments, the outstanding point in both of which is the great value of skim-milk for fattening hogs.

TEST 1.—Pig Feeding Experiment.

Feeds Given.		Meal and Water.	Meal and Milk.	Meal and pulped Turnips, cooked.	Meal and pulped Turnips, raw.	Meal and pulped Mangels, raw.
Number of pigs in lot		15	15	15	15	15
Total weight at beginning of experiment November 21, 1911	Lbs.	1,560	1,406	1,207	1,343	1,552
Average weight	"	104	93·7	80·4	89·5	103·4
Total weight at end of experiment January 16, 1912	"	2,170	2,139	1,699	1,744	2,103
Average weight	"	144·6	142·6	113·2	166·2	140·2
Gain per lot in 56 days	"	610	733	492	401	551
Gain per pig in 56 days	"	40·6	48·8	32·8	26·7	36·7
Average gain per pig per day	"	·72	·87	·58	·42	·65
Amount of meal consumed	"	2,630	2,025	1,809	1,518	2,179
Amount of roots or milk consumed	"	.....	2,025	1,809	1,518	2,179
Total cost of feed for period	$	31 56	28 35	23 50	19 72	28 31
Cost of 1 lb. gain live weight	cts.	5·1	3·8	4·7	4·9	5·1

TEST 2.—Pig Feeding Experiment.

Feeds Given.		Meal and Water.	Meal and Milk.	Meal and pulped Turnips, cooked.	Meal and pulped Turnips, raw.	Meal and pulped Mangels, raw.
Lot.		1	2	3	4	5
Number of pigs in pen		5	5	5	5	5
Total weight at beginning of experiment November 21st, 1911	Lbs.	441	384	275	359	465
Average weight at beginning of experiment	"	88·2	76·8	55	71·8	93
Total weight at end of experiment	"	779	833	510	648	801
Average weight at end of experiment	"	155·8	166·6	102	129·6	160·2
Gain per pen in 112 days	"	338	449	235	289	336
Gain per pig in 112 days	"	67·6	89·8	47·0	57·8	67·2
Average gain per pig per day	"	6	·8	·42	·51	·60
Amount of meal consumed	"	1,430	1,189	920	1,090	1,394
Amount of roots or milk consumed	"	.....	1,189	920	1,090	1,394
Total cost of feed for period	$	17 16	16 63	11 96	14 17	18 11
Cost of 1 lb. gain live weight	cts.	5·0	3·7	5·1	4·9	5 3

FINANCIAL STATEMENT.

Below are submitted inventories and returns from the various classes of live stock under my charge during the year April 1, 1911 to March 31, 1912.

Class.	April 1, 1911.		April 1, 1912.		Returns.	Gross returns made up of increase in value of products and value of animals sold.
	No.	Value.	No.	Value.	Value.	
		$ cts.		$ cts.	$ cts.	$ cts.
Horses	18	.....	18	.....	.....	3,765 72
Breeding cattle	139	17,650 00	98	17,155 00	13,824 29	13,329 29
Steers	19	1,369 00	29	1,139 76	2,013 84	1,784 60
Sheep	88	1,139 00	59	845 00	771 55	477 55
Swine	174	4,371 20	193	4,407 25	3,200 27	3,236 42
Total	438	24,529 20	397	23,547 01	19,809 95	22,593 48

SUMMARY OF LIVE STOCK OPERATIONS.

Returns.

Gross returns from animals of all classes, including value of products, value of service and increase in value of young stock	$22,593 48
Manure, 1,500 tons at $1 per ton	1,500 00
	$24,093 48

EXPENDITURE—VALUE OF FOOD CONSUMED.

Meal, grain, etc., (market price)	$ 5,470 10
Hay at $7 per ton	921 58
Roots, ensilage at $2 per ton	1,186 20
Green feed at $3 per ton	204 57
Whole milk at $1 per 100 lbs	144 96
Skim milk at 20 cents per 100 lbs	416 91
Straw at $5 per ton	810 00
Total	$ 9,154 32

Cost of labour in connection with care of horses, cattle, sheep and swine:—

Herdsman	$ 720 00
One man	600 00
Four men	2,112 00
One man	500 00
Extra help, teaming, etc	230 00
	$ 4,162 00
Total expenditure	13,316 32
Balance	10,777 16
Less cost of new stock purchased, 1911-12	7,655 53
Net balance	$ 3,121 63

SUMMARY OF FARMING AND LIVE STOCK OPERATIONS ON 200-ACRE FARM, 1911.

Returns.

Total value of returns from fields	$ 5,478 90
Total value of returns from live stock	24,093 48
Total returns	$ 29,572 38

Expenditure.

Total cost of field operations	$ 2,858 90
Total cost of live stock operations	13,316 32
Expended, buying stock	7,655 53
Total expenditure	$23,830 75
Balance	5,741 63

COMPARATIVE Statement of Crops on '200 Acre Farm,' from 1899 to 1911 inclusive. (200 Acre Farm includes 7 Acres of Roads.)

YEAR.	GRAIN.		HAY.		ROOTS AND CORN.		PASTURE.		SOILING CROP.		PIG PASTURE.		Remarks.
	Area in Acres.	Yield in Pounds.	Area in Acres.	Yield in Tons.	Area in Acres.	Yield in Tons.	Area in Acres.	Number of Cattle.	Area in Acres.	Disposition of Crops.	Area in Acres.	Crops Grown for Pasture.	
1899	73	118,466	39	93	40	326½	40	36	1	Fed to dairy cows	....	....	Generally considered a good year for all crops.
1900	80	126,621	53	138	40	743	20 and aftermath.	49	....	....	....	.....	Season very favourable for most crops.
1901	79	114,472	58	210	40	702	16 and aftermath.	52	....	.....	..	....	" " "
1902	74	144,914	60	216	39	665	20 and aftermath.	62	.	.....	5	Clover, rape and aftermath.	Season favourable for hay, bad for corn.
1903	69	126,619	62	154	34	473	16 and aftermath.	96	5	Dairy cows, bulls and calves.	6	Clover and rape.	Season very unfavourable for most crops, particularly adverse to corn and roots. No second crop hay.
1904	67	112,009	60	192	46¾	674	13·75	98	3	" " ..	3	" " ..	Season unfavourable for grain and corn, good for hay and roots.
1905	66	111,932	59	258	47	971½	14 and aftermath.	100	5	All cattle ensilage fed.	4	Clover, rape, mixed crop, peas, roots and alfalfa.	Season favourable for hay, corn and roots, too wet for grain on mucky land.
1906	69	125,516	62	140	48	774½	14	105	5	" " ..	3	" " ..	Very bad season. Meadows winter killed. Summer too dry.
1907	61	102,494	73	227	46	704	13·75	110	5	" " ..	3	" " ..	Bad hay year. Grain fair. Corn and roots poor.
1908	61	63,003	62	175	49	670	14	120	5	" " ..	3	" " ..	Very bad year for all classes of crops. Too dry.
1909	65	106,572	57	142	49	878	14	142	5	" " ..	3	" " ..	Bad hay year. Grain fair. Corn and roots good.
1910	59	110,128	60	190	53	880	14	160	5	" " ..	3⅓	" " ..	Fairly good year for all crops.
1911	67	146,490	54	190	57	749	16·5	143	2·8	" " ..	2·8	" " ..	Good year for grain and hay. Corn and roots rather poor.

Of the area indicated as having been used as pasture for swine in 1905, 3 acres yielded a crop of green feed for soiling cattle before being given over to swine. Cattle were pastured on roads where possible. A small rough field not included in '200 Acre Farm' is used as partial pasture and run for about 20 head of young stock. These cattle receive ensilage or other succulent food every day, and meal at the rate of about 1½ lbs. each day part of the time.

The variety of crops grown and the varying areas under each crop each year, make it quite difficult to make a comparison of the returns of the different years, so to simplify matters I would suggest that a fixed valuation be put upon the products and the return of each year valued accordingly.

Fixing prices as follows:—Grain, $1 per 100 lbs.; roots and ensilage, $2 per ton; hay, $7 per ton; summering cattle, $8 per season, and an area used as pasture for pigs, $15 per acre, the returns from the '200-acre farm' for the years mentioned may be said to have been worth $2,776.66 in 1899, $4,110.21 in 1900, $4,434.72 in 1901, $4,787.14 in 1902, $4,148.19 in 1903, $4,741.09 in 1904, $5,714.32 in 1905, $4,669.16 in 1906, $4,931.94 in 1907, $4,631.33 in 1908, $5,502.15 in 1909, $5,521.28 in 1910, and $5,478.90 in 1911.

REMARKS ON ROTATION EXPERIMENTS.

The true farmer will ever have two objects in view when managing his farm: to so manage as to increase gradually but surely the margin of profit and, at the same time, to render his farm more productive. Many factors must necessarily unite to produce such desirable results, but of one feature we may be certain, there will be followed on such a farmer's farm a regular rotation of crops, for no other single practice in farm management can compare with this in importance. The rotation or rotations adopted will, of course, depend upon the line of farming followed, and to some extent upon the character of the soil and the physical peculiarities of the farm as a unit, but a rotation there will be.

Crop rotation means a certain succession of crops which regularly repeats itself each time the course is run. It really means further that the crops follow each other in such order as to insure each having such supplies of plant food of such a character as to aid in securing good returns from each particular crop.

Hence, in arranging a rotation, it is very necessary to have some knowledge of the food requirements of different crops and to know something of the values of the residues from the different crops included. Certain forage crops, such as corn, roots, potatoes and hay require an immense amount of food for stem, leaf and root production—that is an abundance of nitrates as is found in clover or other sod turned down and in well-manured lands. Other crops, such as cereals, can get along best with a lighter supply of nitrates, but need more phosphates, hence do well after some forage crop has taken up the superabundance of free nitrates found after sod. It is evident, therefore, that a good rotation will include (1) meadow or pasture, (2) roots or corn, and (3) some cereal crop.

Various combinations of these three classes are possible, and the natural aim of experimental work will be to determine (1) the comparative values of rotations as soil improvers, and (2) their relative suitability for different lines of farming.

Five or six years' experience with a rotation of five years' duration showed such remarkable results here, that, in 1904, it was decided to begin an experiment that would include a variety of rotations.

Rotation 'A.'

First year.—Land ploughed in August, well worked, ribbed in October; seeded next spring to oats, and 10 lbs. clover sown per acre; allowed to grow one year and turned under as fertilizer for corn.

Second year.—Corn, manure applied in winter or spring, 25 tons per acre; shallow ploughed, corn planted.

Third year.—Grain, seeded down, 8 lbs. red clover, 2 lbs. alsike, 10 to 12 lbs. timothy per acre.

Fourth year.—Clover hay, two crops expected.

Fifth year.—Timothy hay.

Rotation 'B.'

First year.—Grain, land ploughed previous autumn. Seeded down 10 lbs. red clover, 2 lbs. alsike, 5 lbs. timothy per acre.

Second year.—Clover hay, two crops expected.

Third year.—Corn, manured in winter, 20 to 25 tons per acre; spring ploughed.

Fourth year.—Grain, seeded down, red clover 10 lbs. alsike 2 lbs. and 5 lbs. timothy per acre. Land fall-ploughed after corn; very shallow furrow.

Fifth year.—Clover hay, two crops; late fall ploughed.

Rotation 'E.'

First year.—Manured and handled as 'Z.'

Second year.—Oats, seeded down, 10 lbs. red clover, 6 lbs. alfalfa, 2 lbs. alsike, 6 lbs. timothy per acre.

Third year.—Pasture. Cattle.

Rotation 'Z.'

First year.—Manure, 12 to 15 tons per acre, applied winter; shallow ploughed in spring; well worked and planted to corn.

Second year.—Oats, seeded down, 10 lbs. red clover, 2 lbs. alsike, 6 lbs. alfalfa and 6 lbs. timothy per acre.

Third year.—Clover hay; two crops expected.

Rotation 'S.'

Shallow ploughing; deep cultivation by means of stiff tooth cultivator or subsoiler.

First year.—Roots or corn, ploughed August, 4 inches deep; manure 15 to 20 tons per acre; work at intervals, ridge up in fall, sow to roots in spring.

Second year.—Grain, seeded down, 10 lbs. red clover, 12 lbs. timothy per acre.

Third year.—Clover hay.

Fourth year.—Timothy hay.

Rotation 'D.'

Deep ploughing; plough August, 7 inches deep; manure 15 to 20 tons per acre; work with cultivator at intervals. Land ploughed late autumn, 7 inches; roots or corn next spring.

Second, third and fourth year.—Same as 'S.'

Rotation 'H.'

First year.—Manured in fall and manure ploughed in, well worked; sown to roots next spring.

Second year.—Different grain mixtures suitable for feeding green. Different grass seed mixtures suitable for pasture and soiling next year.

Third year.—Pasture. Swine.

Rotation 'T.'

Sheep pasture.

Crops just as in 'H' save that various mixtures of grain and grass seed are used to test their value for sheep feeding and pasturing.

Rotation 'A' Fertilizer.

Using barn-yard manure only. Four years' duration. Roots, grain, hay, hay. Barn-yard manure 15 tons per acre for roots.

Rotation 'B' Fertilizer.

Commercial fertilizer but no barn-yard manure. Four years' duration. Roots, grain, hay, hay. Commercial fertilizer: 300 lbs. superphosphate; 75 lbs. muriate of potash; 100 lbs. nitrate of soda, before sowing to roots. Each other year 100 lbs. nitrate of soda only.

Rotation 'C' Fertilizer.

Half usual dressing barn-yard manure and commercial fertilizer besides. Four years' duration. Roots, grain, hay, hay. Barn-yard manure 7½ tons per acre for roots; commercial fertilizer at same time, 150 lbs. superphosphate; 37½ lbs. muriate of potash and 50 lbs. nitrate of soda. Besides, 100 lbs. nitrate of soda each year in hay or grain.

RETURNS PER ACRE.

To compare results under such varied crop and cultural conditions is a rather difficult matter. The plan adopted has been to place an arbitrary and uniform valuation on all products and on pasturing various classes of stock. Following this plan, the returns per acre have been about as follows, the average of six years' work, save in case of rotation 'T' which is for one year only, and fertilizers 'A,' 'B' and 'C,' which are for two years.

Rotation 'A.'

Average value of crop per annum—$23.08.

Rotation 'B.'

Average value of crop per annum—$23.61.

Rotation 'E.'

Average value of crop per annum—$21.24.

Rotation 'Z.'

Average value of crop per annum—$25.43.

Rotation 'S.'

Average value of crop per annum—$25.68.

Rotation 'D.'

Average value of crop per annum—$25.63.

Rotation 'H.'

Average value of crop per annum—$28.35.

Rotation 'T.'

Average value of crop per annum—$19.92.

Rotation 'A' Fertilizer.

Average value of crop per acre—$25.51.

Rotation 'B' Fertilizer.

Average value of crop per acre—$25.22.

Rotation 'C' Fertilizer.

Average value of crop per acre—$27.65.

PROFITS PER ACRE.

The values placed on products were: Roots or silage stored, $2 per ton; soiling crops, $3 per ton; hay, $7 per ton; grain, $1 per 100 lbs.; oat straw, $4 per ton; pasturing cows, $1 per month. Sheep and swine pastured one cent per day.

In estimating cost of operation, labour is charged at prices paid, machinery is put at 30 cents per acre, rent at $3 per acre and manure at $3 per acre.

The average net profits, after paying all expenses, were as follows per acre:

'A' net profit per acre	$9 04
'B' " "	9 22
'E' " "	7 59
'Z' " "	9 62
'S' " "	8 11
'D' " "	8 10
'H' " "	8 32
'T' " "	5 50
'A' Fertilizer net profit per acre	8 15
'B' Fertilizer " "	5 66
'C' Fertilizer " "	9 02

VALUE OF DIFFERENT ROTATIONS.

A study of the various rotations would lead one to remark upon them briefly as follows:—

Rotation 'A.'—This rotation has been in use here for 13 years and has proven to be most excellent where carefully followed and cultural operations well performed. Where all land was under cultivation, it would be found necessary to devote a certain area to soiling crops. It might be extended to six years by leaving down to pasture for two years instead of one.

Rotation 'B.'—This rotation has been fairly successful here, but, for certain reasons not easily enumerated, I do not feel as though I could either criticise or praise as yet and feel sure of my ground.

Rotation 'E.'—This rotation would not be suitable for the average farmer but might suit the man who had to buy rough forage.

Rotation 'Z.'—This would be a most excellent rotation to put into practice where sufficient rough land was available to serve as pasturage. It is the rotation that would most likely supply the greatest amount of forage of the best description for dairying or beef production. It is better suited for heavy than for light soils.

Rotation 'S.'—This is a rotation that has been in use for a number of years on the Agricultural College Farm at Guelph, where it has given satisfactory results. It is possibly open to the criticism of having too small a proportion of land under grain. Where live stock is, however, the mainstay, this is a very minor fault. The turning of a shallow furrow when ploughing sod has been found to be good practice here when preparing for grain or corn. In preparing for roots, the regular plough with sub-soiler is to be advised.

Rotation 'D.'—This rotation is the same as rotation 'S' so far as crops are concerned. The results so far obtained show the advantage in favour of either shallow ploughing and deep cultivation or deep ploughing.

Rotation 'H.'—The area devoted to pigs (some 10 acres) where this rotation is followed has given very satisfactory returns, and would, I feel confident, prove profitable to any one who followed it carefully.

Rotation 'T.'—Sheep. The returns from this rotation are not strictly comparable with those from others, since many side experiments materially affect the results.

THE ROTATIONS IN 1911.

The experiment to determine the values of the different rotations as discussed above is being followed up, and below the detailed report of the labour on each plot and the return therefrom, will be found some brief notes on each field and on the rotation as a whole.

The rotations are as follows:—

Rotation 'A.'—Five years. Clover hay, timothy hay, grain, corn, grain.

Rotation 'B.'—Five years. Clover hay, grain, clover hay, corn, grain.

Rotation 'E.'—Three years. Pasture, corn, grain.

Rotation 'Z.'—Three years. Clover hay, corn, grain.

Rotation 'S.'—Four years. Shallow ploughing, clover hay, timothy hay, roots, grain.

Rotation 'D.'—Four years. Deep ploughing, clover hay, timothy hay, roots, grain.

Rotation 'H.'—Three years. Hog pasture, roots, grain or soiling crops.

Rotation 'T.'—Three years. Sheep pasture, roots and soiling crops, grain.

Rotation 'A'. Fertilizer.—Four years. Roots, grain, hay, hay. (Barn-yard manure).

Rotation 'B' Fertilizer.—Four years. Roots, grain, hay, hay. (Commercial fertilizer).

Rotation 'C' Fertilizer.—Four years. Roots, grain, hay, hay. (Commercial fertilizer and barn-yard manure).

In the description of the rotations and fields that follows an effort is made to give as concisely as possible the location of each field, its size, the character of its soil, its drainage and its general crop history.

In the tables will be found all items of expenditure. The manure is applied in the same ratio to each field in each rotation. To illustrate: If to the corn land in rotation 'Z,' 15 tons of manure per acre is applied, this is equivalent to 5 tons per

acre per annum, as 'Z' is a three-year rotation. Then, in applying manure to 'B' 25 tons would be applied, as 'B' is a five-year rotation. Since manure must vary in quantity each year, $3 per acre per annum is charged in each rotation.

COMPARATIVE VALUES OF ROTATIONS ON STOCK FARMS.

Supposing the average animal of the bovine species to consume 2,000 lbs. hay, 6 tons ensilage and roots, 1 ton straw, 4 months' pasture and 1,000 lbs. meal in a year, this would amount to about $37 or $38 as the cost of feeding an animal for a year. Keeping these figures in mind, the stockman can form some idea of the comparative values of the different rotations for live stock farming.

ROTATION

Lot.	Location.	Description of Soil.							Area in acres.	Crops.		Items of	
		Sand	Sandy loam.	Clay loam.	Clay.	Black muck.	Gravel.	Hard pan.				Rent and manure.	Seed, twine and use of machinery.
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	Ac.	1910.	1911.	$ cts.	$ cts.
A1	W.S. 3	30	45	....	....	25	....	....	9·96	Grain	Corn	59 76	17 14
A2	L.S. 1	30	65	5	....	....	....	....	8·90	Hay	Grain	53 40	14 07
A3	A.S. 14	10	15	20	20	15	....	20	10·20	Corn	Grain	61 20	16 56
A4	W.P.G.S.1 / F.S. 1	70	20	10	....	....	....	....	8·85	Hay	Hay	53 10	11 50
A5	....	....	35	30	10	15	10	....	8·56	Grain	Hay	51 36	11 12
		Aggregate							46·47			278 82	70 39
		Average per acre, 1911							....	....	....	6 00	1 51
		Average for 7 years							....	....	....	6 00	1 55

ROTATION

B 1	W.S. 4	5	35	5	50	5	....	....	10·00	Grain	Hay	60 00	13 00
B 2	L.S. 2	20	70	....	5	5	....	....	8·82	Grain	Hay	52 92	11 46
B 3	A.S. 15	20	60	5	....	15	....	....	10·20	Hay	Corn	61 20	18 06
B 4	W.P.G.S.2	20	60	15	....	5	....	....	9·15	Hay	Grain	54 90	23 20
B 5	F.S. 2	....	30	30	40	....	....	....	8·93	Corn	Grain	53 58	14 40
		Aggregate							47 10			282 60	80 12
		Average per acre, 1911							....	....	....	6 00	1 70
		Average for 7 years							....	....	....	6 00	1 53

Rotation 'A.'

This rotation of five years' duration includes grain, hay (two years), grain and corn or roots, in order named. The grain crop mentioned first, comes after corn. With the first crop of grain is sown 10 lbs. red clover, 1 lb. alsike and 10 lbs. timothy per acre. The field is left in hay for two years; then in August of the second year it is ploughed and cultivated at intervals till October, when it is ridged up and left till next spring. Oats are sown on this field, and with them red clover seed at the rate of 10 lbs. per acre. This clover is allowed to grow for something over a year, or until corn seeding time the following spring, when it is turned under with a shallow furrow along with the manure that will have been applied during the winter. After the corn has been harvested, the land is ploughed shallow and left till next spring.

The crops on this rotation have been fairly satisfactory this year.

'A 1' returned a fair crop of corn. 'A2' and 'A3' yielded splendid crops of grain. 'A4' and 'A5' grew heavy crops of hay.

"A."

Expense in Raising Crop of 1911.								Particulars of Crop in 1911.						
Manual Labour.		Horse Labour.												
Hours.	Cost of manual labour.	Hours with single horse.	Hours with team.	Value of horse labour.	Threshing.	Total cost.	Cost for one acre.	Grain.	Straw.	Hay.	Roots, ensilage and soiling crops.	Total value.	Value of crop per acre.	Profit per acre in 1911.
No.	$ cts.	No.	No.	$ cts.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.
262	43 23	24	176	62 43	.....	182 56	18 32	.....	.....	.....	229,610	229 61	23 05	4 73
47	7 75	3	115½	43 59	14 75	133 56	15 00	17,360	28,820	.....	.....	231 24	25 97	10 97
74	12 21	4	78½	28 66	20 45	139 08	13 63	24,060	35,450	.....	.....	311 50	30 53	16 90
129	21 29	20½	60	23 13	.....	109 02	12 31	.....	.....	44,540	.....	155 89	17 61	5 30
90	14 85	16½	48½	18 68	.... .	96 01	11 21	.....	.....	64,800	.....	226 80	26 49	15 28
602	99 33	68	478½	176 49	35 20	660 23	.....	41,420	64,270	109,340	229,610	1,155 04	... .	.....
12·9	2 13	1·4	10·2	3 80	0 75	...	14 20	891	1,383	2,352	4,941	.....	24 85	10 65
14 1	2 24	3·7	10·1	4 10	0 39	.....	14 43	666	848	1,962	5,970	.....	23 08	9 04

"B."

113	18 65	13	46½	17 20	....	108 85	10 88	.....	.....	90,010	.....	315 03	31 50	20 62
83	13 69	11½	41	15 17	.....	93 24	10 57	.....	.....	52,120	. ....	182 42	20 68	10 11
360	60 39	18	203	70 59	.....	210 24	20 61	....	...	.....	267,590	267 59	26 23	5 62
61	10 07	4	93	33 22	17 46	138 85	15 17	20,544	29,000	.....	... . ..	263 44	28 79	13 62
53	8 75	3	84	30 27	15 05	122 05	13 66	17,708	25,052	.....	.....	227 18	25 44	11 78
676	111 55	49½	467½	166 45	32 51	673 23	.....	38,252	54,052	142,130	267,590	1,255 66	.....	.....
14·1	2 36	1·0	9·9	3 53	0 69	. ....	14 29	812	1,147	3,017	5,681	.....	26 65	12 36
12·9	2 46	4 1	9·6	4 20	0 38	.....	14 63	618	978	2,573	5,963	....	23 61	9 22

Rotation 'B.'

This rotation of five years' duration includes grain, hay, grain, hay and corn or roots in the order named, the first crop of grain following a crop of corn or roots. Red clover, 10 lbs., alsike, 1 lb. and timothy, 5 lbs., is sown with grain each time. When grain follows hay, the land is ploughed in the early fall. When corn follows hay the land is ploughed in the spring, the spring growth of grass and clover being ploughed in along with the manure which will have been applied during the preceding winter.

The crops on this rotation were fairly satisfactory.

'B 1' and 'B 2' yielded heavily of hay. On 'B 3' just a fair crop of corn was harvested. The grain on both 'B 4' and 'B 5' was very good.

ROTATION

Lot.	Location.	Description of Soil.							Area in Acres.	Crops.		Items	
		Sand.	Sandy loam.	Clay loam.	Clay.	Black muck.	Gravel.	Hardpan.				Rent and manure.	Seed, twine and use of machinery.
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	Ac.	1910.	1911.	$ cts.	$ cts
E 1	W. S. 1	40	40	....	....	15	5	....	14·00	Corn	Grain	84 00	24 00
E 2	L. S. 4	10	60	....	10	20	....	....	18.00	Pasture	Corn	108 60	29 80
E 3	Morn	30	60	....	5	....	5	....	13.80	Grain	Pasture	82 80	13 80
		Aggregate							45·80			274 80	67 60
		Average per acre in 1911										6 00	1 47
		Average for 7 years										6 00	1 70

ROTATION

Z 1	W. S. 2	40	40	....	....	15	5	....	6·00	Corn	Grain	36 00	9 60
Z 2	L. S. 3	10	60	10	....	20	....	....	5·81	Hay	Corn	34 86	9 75
Z 3	Obs	10	60	20	10	....	....	....	4·20	Grain	Hay	25 20	5 46
		Aggregate							16·01			96 06	24 81
		Average per acre in 1911										6 00	1 54
		Average for 7 years										6 00	1 70

Rotation 'E.'

This rotation of three years' duration includes grain, pasture and corn.

The grain comes after the corn, the stubble of which is treated as described under rotation 'A.' With the grain in the spring is sown 10 lbs. red clover, 2 lbs. alsike, 6 lbs. alfalfa and 6 lbs. timothy seed per acre. If weather permits, the field is pastured slightly in the fall.

After the grain crop the land is pastured, the grass seeding having been done with this object in view. In estimating the value of the returns from this field pasture is charged at $1 per month per cow. At this rate the returns fall very short of what would have been the returns if a hay crop had been harvested, if we may judge by the returns from 'Z.' This rotation and rotation 'Z' were introduced into the list in order to gain some idea as to the difference in returns probable from land pastured and land from which all the crops are harvested. It was expected that the corn crop after the pasture would in a measure make up for the difference in favour of the no-pasture rotation 'Z,' but the returns are on the whole a good deal short of those from 'Z.'

Corn follows the pasture. Manure is applied during the fall and winter and turned under with the growth of clover and grass in the spring.

Oats and hay good, corn just fair on this rotation in 1911.

"E."

OF EXPENSE IN RAISING CROP IN 1911.								PARTICULARS OF CROP IN 1911.						
Manual Labour.		Horse Labour.												
Hours.	Cost of manual labour.	Single Horse.	Hours with team.	Value of horse labour.	Threshing.	Total cost.	Cost for one acre.	Grain.	Straw.	Hay.	Roots, ensilage and soiling crops.	Total value.	Value of crop per acre.	Profit per acre in 1911.
No.	$ cts.	No.	No.	$ cts.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.
90	14 85	4½	108½	39 85	27 74	190 44	13 60	32,647	48,523	.....	.....	423 51	30 25	16 65
398	65 67	16	260½	100 65	.....	304 12	16 89	.....	.....	.....	468,490	468 49	26 02	9 13
.....	.....	.....	.....	.....	.....	96 60	7 00	.....	.....	.....	.....	138 00	10 00	3 00
488	80 52	20½	369	140 50	27 74	591 16	.....	32,647	48,523	.....	468,490	1,030 00	.....	.....
10·6	1 75	·4	8·0	3 06	0 60	.....	12 90	712	1,059	.....	10,229	.....	22 48	9 58
14·9	1 86	1·8	9·2	5 28	0 42	.....	14 17	588	806	.....	9,337	.....	21 24	7 59

"Z."

38	6 27	....	56	19 08	10 85	81 80	13 63	12,769	14,271	.....	.....	156 23	26 04	12 41
138	22 77	10	106	35 83	.....	103 21	17 76	....	.....	.....	144,150	144 15	24 81	7 05
29	4 79	6	17	6 60	.....	42 05	10 01	.....	.....	30,510	.....	106 78	25 42	15 41
205	33 83	16	179	61 51	10 85	227 06	.....	12,769	14,271	30,510	144,150	407 16	....	.....
							14 18							
12·8	2 11	·9	11·1	3 84	0 67	.....	....	797	891	1,900	9,003	.....	25 43	11 32
13·8	2 31	4·5	9·2	3 83	0 34	.....	13 09	580	785	2,108	9,767	.....	25 43	9 62

Rotation 'Z.'

This rotation of three years' duration includes corn, grain and clover hay in the order named.

Corn comes after the clover hay. The manure is applied during the fall or during the winter and spring, and the clover allowed to grow up through it, so facilitating the turning under of the whole mass of manure, late fall growth and spring growth of clover a few days before the corn is to be sown. The furrow turned is quite shallow, about five inches deep, and the land is then disc-harrowed and the corn sown in rows 42 inches apart. It receives later the usual cultivation and care.

Grain follows corn, the land having been ploughed in the fall. With the grain there is sown 10 lbs. red clover, 2 lbs. alsike, 6 lbs. alfalfa and 6 lbs. timothy seed per acre. The hay is cut twice and the last aftermath allowed to grow up to be turned under the next spring for corn. Such a rotation would be particularly valuable to a farmer having sufficient rough land for pasture, or to one desirous of keeping as many cattle as possible on the land at his disposal, supposing him willing to grow roots and corn.

Good crop of oats and hay, corn only fair.

ROTATION

Lot.	Location.	Description of Soil.							Area in Acres.	Crops.		Items	
		Sand.	Sandy loam.	Clay loam.	Clay.	Black muck.	Gravel.	Hardpan.				Rent and manure.	Seed, twine and use of machinery.
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	Ac.	1910.	1911.	$ cts.	$ cts.
S 1	E.P.G.S. 1.	20	80	..	....	....	....	....	2	Hay..	Corn	12 00	3 40
S 2	E.P.G.S. 3.	20	80	....	....	....	....	....	2	Corn	Grain	12 00	3 30
S 3	E.P.G.S. 5.	30	70	....	....	....	....	....	2	Grain	Hay..	12 00	2 60
S 4	E.P.G.S. 7.	60	40	....	....	....	....	....	2	Hay.-	Hay..	12 00	2 60
		Aggregate							8			48 00	11 99
		Average per acre in 1911										6 00	1 48
		Average for 7 years										6 00	1 30

ROTATION

D 1	E.P.G.S. 2.	20	80	....	....	....	....	....	2	Hay..	Corn	12 00	3 40
D 2	E.P.G.S. 4.	20	80	....	....	....	....	....	2	Corn	Grain	12 00	3 30
D 3	E.P.G.S. 6.	30	70	....	....	....	....	....	2	Grain	Hay..	12 00	2 60
D 4	E.P.G.S. 8.	60	40	....	....	....	....	....	1·56	Hay.-	Hay..	9 36	2 02
		Aggregate							7·56			45 36	11 32
		Average per acre in 1911										6 00	1 49
		Average for 7 years										6 00	1 29

Rotation 'S.'

(Shallow Ploughing).

This rotation is of four years' duration and includes grain, two years' hay, roots or corn.

The grain crop follows the hoed crop, the land being ploughed (or cultivated) to a depth of about four inches after the hoed crops are harvested in the fall. With the grain is sown 10 lbs. red clover and 12 lbs. timothy seed per acre. The clover hay is cut twice in the season and the second aftermath left on the field; that is, it is not pastured off as is usually done. In the second hay year, two crops are cut if possible, and the land ploughed in August with a shallow four-inch furrow. If manure is applied before ploughing, a subsoiler is attached to the plough to loosen up the soil to a depth of 8 or 9 inches. If manure is not applied, this end is attained by means of a strong, deep-reaching cultivator after the sod has rotted in the fall or the next spring.

'S 1' returned a fair crop of corn. 'S 2' was under grain which yielded well. 'S 3' and 'S 4' had heavy crops of hay.

SESSIONAL PAPER No. 16

"S"

OF EXPENSE IN RAISING CROP IN 1911.								PARTICULARS OF CROP IN 1911.						
Manual Labour.		Horse Labour.												
Hours.	Cost of manual labour.	Hours with single horse.	Hours with team.	Value of horse labour.	Threshing.	Total cost.	Cost for one acre.	Grain.	Straw.	Hay.	Roots, ensilage and soiling crops.	Total value.	Value of crop per acre.	Profit per acre in 1911.
No.	$ cts.	No.	No.	$ cts.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.
66	10 89	7	49	18 22	....	44 51	22 25	.....	....	.....	54,830	54 83	27 41	5 16
9	1 49	.. .	19	6 57	3 53	26 89	13 44	4,158	6,742	.....	... .	55 06	27 53	14 09
20½	3 38½	3½	9⅓	3 72½	.....	21 71	10 85	.. ...	.....	16,770	.....	58 69	29 34	18 49
20½	3 38½	2½	7½	2 87½	.....	20 86	10 43	....	.....	11,850	.....	41 47	20 73	10 30
116	19 15	13	85	31 39	3 53	113 97	.....	4,158	6,742	28,620	54,830	210 05	.....	.. ..
34·5	2 39	1·6	10·6	3 92	0 44	...	14 24	519	842	3,577	6,853	.....	26 25	12 01
12·6	5 08	5·0	11·2	5 04	0 24	.....	17 43	561	590	3,085	9,784	.....	25 63	8 11

"D"

66	10 89	7	48	18 49	.....	44 78	22 39	.....	.....	... .	56,340	56 34	28 17	5 78
9	1 49	....	19	6 57	3 67	27 03	13 51	4,323	5,827	.. ..	.....	54 88	27 44	13 93
20½	3 38½	3½	9½	3 72½	.....	21 71	10 85	.....	.....	15,950	.....	55 82	27 91	17 06
17	2 81	2	5½	2 15	.....	16 34	10 47	.....	.....	10,010	.....	35 03	22 45	11 98
112½	18 57½	12½	82	30 93½	3 67	109 86	.....	4,323	5,827	25,960	56,340	202 07	.. .	.....
14·8	2 45	1·6	10·8	4 09	0 48	.....	14 53	571	770	3,433	7,452	.....	26 72	12 19
29·8	5 13	4·2	11·7	5 79	0 25	.....	17 68	591	569	3,046	10,026	.....	25 64	8 10

Rotation 'D.'

(Deep Ploughing).

This rotation is of four years' duration and includes grain, two years' hay and corn or roots.

The grain crop follows hoed crop, the land being ploughed to a depth of about seven inches, or cultivated after the hoed crops are harvested in the fall. With the grain is sown 10 lbs. red clover and 12 lbs. timothy seed per acre. The clover hay is cut twice in the season, and the second aftermath left on the field; that is, it is not pastured off as is usually done. In the second hay year two crops are cut if possible, and the land ploughed in August with a deep seven-inch furrow.

From 'D 1' was harvested a fair crop of corn. The grain on 'D 2' was good. 'D 3' and 'D 4' grew excellent crops of hay.

ROTATION

Lot.	Location.	Description of Soil.							Area in Acres.	Crops.		Items of	
		Sand.	Sandy loam.	Clay loam.	Clay.	Black muck.	Gravel.	Hardpan.				Rent and manure.	Seed, twine, and use of machinery.
		p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	Ac.	1910.	1911.	$ cts.	$ cts.
H 1	H.S. 1	30	40	20	10	....	....	....	3·35	Pasture	Roots	20 10	4 35
H 2	H S. 2	25	45	20	10	....	....	....	3·15	Roots	Grain	18 90	4 99
H 3	H.S. 3	10	20	50	20	....	....	....	2·85	Grain	Pasture	17 10	2 85
	Aggregate								9·35			56 10	12 19
	Average per acre in 1911											6 00	1 30
	Average for 7 years											6 00	1 12

ROTATION

T 1	S.S. 1	10	90	....	....	....	..	....	2·78	Roots	Soiling crop.	16 68	3 51
T 2	S.S. 2	15	55	....	....	....	30	....	2·78	Soiling crop.	Pasture	16 68	2 78
T 3	S.S. 3	....	50	....	....	....		..	2·78	Pasture	Roots	16 68	3 51
	Aggregate								8·34			50 04	9 80
	Average per acre in 1911											6 00	1 17
	Average for 1 year											6 00	1 32

Rotation 'H.'

(Hog Farm).

This rotation is of three years' duration, and includes soiling crop and pasture in the order named. The land is ploughed late in the fall after it has been manured It is disced the next spring and the roots sown on ridges. The roots receive the usual cultivation and are of varied character, including mangels, sugar mangels, sugar beets and turnips, devoted to pork production for the most part, the surplus being charged to cattle and the returns invested in meal for pig feeding.

The soiling crop field is sown with various crops suitable for feeding to pigs. What is over and above the amount possible of consumption by pigs is charged to the cattle at $2 per ton and the returns used to purchase meal for pork production.

The pasture area is divided into several parts, the seeds being sown, as far as possible, at the same time as the soiling crops the previous year, and not allowed to be eaten too close the first fall, although any good growth is not wasted.

'H 1.'—Returned a fair crop of roots.

'H 2.'—Was under grain and a good crop was harvested.

'H 3.'—This plot was used for pasture.

SESSIONAL PAPER No. 16

"H."

Expense in Raising Crop in 1911.								Particulars of Crop, 1911.						
Manual Labour.		Horse Labour.												
Hours.	Cost of manual labour.	Hours with single horse.	Hours with team.	Value of horse labour.	Threshing.	Total cost.	Cost for one Acre.	Grain.	Straw.	Hay.	Roots and ensilage and soiling crops.	Total value.	Value of crop per Acre.	Profit per acre in 1911.
No.	$ cts.	No.	No.	$ cts.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.
325	53 62	16	73	26 62	.....	104 69	31 25	.....	.....	.....	120,680	120 68	36 00	4 75
24	3 96	....	25½	8 91	6 66	43 42	13 78	7,845	9,625	.....	.....	97 70	31 01	17 23
.....	....	....	.....	.....	.....	19 95	7 00	.....	.....	.....	.....	42 75	15 00	8 00
349	57 58	16	98½	35 53	6 66	168 06	.. .	7,845	9,625	.....	120,680	261 13	.....	.. .
37·3	6 15	1·7	10·5	3 80	0 71	.....	17 97	839	1,029	.....	12,907	.....	27 93	9 95
38·2	4 53	4·6	9 5	4 20	0 22	.....	14 75	263	470	396	17,153	.....	28 35	8 32

"T."

26	4 29	3	36½	12 78	.....	37 26	13 40	.....	.....	.....	44,790	67 18	24 16	10 76
.....	.....	.....	.....	.....	.....	19 46	7 00	.....	....	.....	.....	41 70	15 00	8 00
188	31 02	22	51	16 50	.....	67 71	24 35	.....	.....	.....	75,860	75 86	27 28	2 93
214	35 31	25	87½	29 28	.....	124 43	.....	.....	.....	.....	120,650	184 74	.....	.....
25·6	4 23	2·9	10·4	3·51	.....	.....	14 91	.. .	.....	.....	14,466	.....	22 15	7 23
27·0	4 05	4·2	9·4	3·90	. ...	.....	15 31	.....	.... .	1,440	9,524	.....	19 92	5 50

Rotation 'T.'

(Sheep Farm).

This rotation of three years' duration includes roots, grain and pasture.

The area devoted to sheep farming is rather limited, about 11·03 acres. This area is not included in the '200-acre' farm. The whole area has been for several years devoted to pasturing sheep, but it has been divided into four rather unequal fields, susceptible of further subdivision, and devoted to a rotation considered suitable for sheep.

The root field is devoted to white turnips, swedes, cabbage, kohl rabi, thousand-headed kale, etc. It comes after the pasture, the land being manured and ploughed in the fall.

Grain follows on the root land, and with the grain various clovers and grass seeds are sown to prepare for the ensuing two years. The grain may be harvested or used for soiling crop for sheep. The hay field is expected to give one crop of hay and then be devoted to pasture for lambs as soon as they are weaned.

The pasture field is the field that has been in hay the previous year. Alfalfa, red clover, alsike clover, brome grass (*bromus inermis*) and timothy are the clovers and grasses used.

The crops on this rotation were fair this year.

ROTATION "A"

Lot.	Location.	Description of Soil.							Area in Acres.	Crops.		Items of	
		Sand.	Sandy loam.	Clay loam.	Clay.	Black muck.	Gravel.	Hardpan.				Rent and Manure.	Seed, twine and use of machinery.
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	Ac.	1910.	1911.	$ cts.	$ cts.
A 1	A.S. 2			75					1	Hay	Hay	5 25	1 30
A 2	A.S. 5		25	75					1	Hay	Roots	5 25	1 30
A 3	A.S. 8			10		90			1	Grain	Hay	5 25	1 30
A 4	A.S. 11			20		80			1	Roots	Grain	5 25	1 70
	Aggregate								4			21 00	5 60
	Average per acre in 1911											5 25	1 40
	Average for 2 years											5 25	1 38

ROTATION "B"

B 1	A.S. 3		25	75					1	Hay	Hay	7 50	1 30
B 2	A.S. 6		5	85		10			1	Hay	Roots	7 50	1 30
B 3	A.S. 9					100			1	Grain	Hay	7 50	1 30
B 4	A.S. 12			50		50			1	Roots	Grain	7 50	1 70
	Aggregate								4			30 00	5 60
	Average per acre in 1911											7 50	1 40
	Average for 2 years											7 50	1 33

ROTATION "C"

C 1	A.S. 4		25	75					1	Hay	Hay	6 60	1 30
C 2	A.S. 7			70		30			1	Hay	Roots	6 60	1 30
C 3	A.S. 10					100			1	Grain	Hay	6 60	1 30
C 4	A.S. 13			30			50	20	1	Roots	Grain	6 60	1 70
	Aggregate								4			26 40	5 60
	Average per acre in 1911											6 60	1 40
	Average for two years											6 60	1 38

SESSIONAL PAPER No. 16

FERTILIZER.

Expense in Raising Crop in 1911.								Particulars of Crop in 1911.						
Manual Labour.		Horse labour.												
Hours.	Cost of manual labour.	Hours with single horse.	Hours with team.	Value of horse labour.	Threshing.	Total cost.	Cost for one acre.	Grain.	Straw.	Hay.	Roots, ensilage and soiling crop.	Total value.	Value of crop per acre.	Profit per acre in 1911.
No.	$ cts.	No.	No.	$ cts.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.
5½	91	1	3	1 15	.....	8 61	8 61	.....	.....	5,340	.....	18 69	18 69	10 08
70	11 55	8	21	9 62	.....	27 72	27 72	.....	.....	.....	28,160	28 16	28 16	44
11	1 82	2	6	2 30	.....	10 67	10 67	.....	.....	9,470	.....	33 14	33 14	22 47
6	99	....	9¼	3 27	1 25	12 46	12 46	1,474	2,436	.....	.....	19 61	19 61	7 15
92½	15 27	11	42¼	16 34	1 25	59 46	.....	1,474	2,436	14,810	28,160	99 60	.....	.....
23·1	3 81	2·7	10·5	4·08	0 31	.....	14 86	368	609	3,702	7,040	.....	24 90	10 04
41·5	6 40	3·5	12·1	4 86	0 19	.....	18 18	244	429	2,770	12,726	.....	25 51	8 15

FERTILIZER.

7	1 16	1	3	1 15	.....	11 11	11 11	.....	.....	4,480	.....	15 68	15 68	4 57
71⅓	11 80	8	14	6 62	.....	27 22	27 22	.....	.....	.....	22,730	22 73	22 73	4 99
12½	2 06	2	6	2 30	.....	13 16	13 16	.....	.....	8,800	.....	30 80	30 80	17 64
8½	1 40	....	9¼	3 27	1 45	15 32	15 32	1,709	2,530	.....	.....	22 15	22 15	6 83
99½	16 42	11	32¾	13 34	1 45	66 81	.....	1,709	2,530	13,280	22,730	91 36	.....	.....
24·8	4 10	2·7	8·0	3 33	0 36	.....	16 70	427	632	3,320	5,682	.....	22 84	6 01
43·7	6 69	3·5	11·2	4 61	0 21	.....	20 42	277	438	2,676	12,948	.....	25 22	5 66

FERTILIZER.

7	1 16	1	3	1 15	.....	10 21	10 21	.....	.....	5,800	.....	20 30	20 30	10 09
72	11 88	8	19	8 12	.....	27 90	27 90	.....	.....	.....	29,970	29 97	29 97	2 07
12½	2 06	2	6	2 30	.....	12 26	12 26	.....	.....	9,360	.....	32 76	32 76	20 50
7½	1 24	....	8¾	3 12	1 60	14 26	14 26	1,893	2,777	.....	.....	24 48	24 48	10 22
99	16 34	11	36¾	14 69	1 60	64 63	.....	1,893	2,777	15,160	29,970	107 51	.....	.....
24·7	4 08	2·7	9·1	3 67	0 40	.....	16 16	473	694	3,790	7,492	.....	26 87	10 72
42·5	6 57	3·5	11·6	4 73	0 22	.....	19 60	289	462	2,982	13,736	.....	27 65	9 02

'A.'—This rotation is of four years' duration and includes grain, hay two years, roots. The grain follows roots, the land being ploughed or cultivated in the fall after the hoed crop is harvested. With the grain is sown 8 lbs. red clover 2 lbs. alsike and 12 lbs. timothy per acre. The clover hay is cut twice in the season. In the second hay year, two crops are cut if possible. Then the land is manured at the rate of 15 tons, barn-yard manure, per acre, and ploughed in August 5 inches deep, worked at intervals during the autumn and ribbed up in the late fall. The following spring the land is worked into good tilth and sown to roots.

'B.'—This rotation is of four years' duration and includes grain, hay two years, and roots. The grain follows roots or corn, the land being ploughed or cultivated in the fall after the hoed crop is harvested. With the grain is sown 8 lbs. red clover, 2 lbs. alsike and 12 lbs. timothy per acre. The clover hay is cut twice in the season. In the second hay year, two crops are cut if possible. Then the land is ploughed in August 5 inches deep and worked at intervals during the autumn and ribbed up in the late fall. The following spring the land is worked into good tilth and 300 lbs. superphosphate, 75 lbs. muriate of potash and 100 lbs. nitrate of soda is applied before being sown to roots or corn. In addition to the above, the land receives a dressing of 100 lbs. nitrate of soda per acre each year that the field is in hay or grain. This application is given in early spring on the grass and just as the grain is coming through, when under grain.

'C.'—This rotation is of four years' duration and includes grain, hay two years, roots. The grain follows the roots or corn, the land being ploughed or cultivated in the fall after the hoed crop is harvested. With the grain is sown 8 lbs. red clover, 2 lbs. alsike and 12 lbs. timothy per acre. The clover hay is cut twice in the season. In the second hay year, two crops are cut if possible; then the land is manured at the rate of 7½ tons barn-yard manure per acre and ploughed in August 5 inches deep, worked at intervals during the autumn and ribbed up in the late fall. The following spring the land is worked into good tilth and 150 lbs. superphosphate, 37½ lbs. muriate of potash and 50 lbs. nitrate of soda is applied before being sown to roots. In addition to the above the land receives a dressing of 100 lbs. nitrate of soda per acre each year that the field is in hay or grain. This application is given in early spring on the grass and just as the grain is coming through, when under grain.

REPORT OF THE DOMINION HORTICULTURIST

W. T. MACOUN.

Ottawa, March 31, 1912.

J. H. Grisdale, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith the twenty-fifth Annual Report of the Horticultural Division, in which will be found information in regard to its work, the results of some of the experiments which have been conducted, and other matters relating to horticulture in Canada.

CHANGES AND DEVELOPMENTS IN THE HORTICULTURAL DIVISION.

Central Farm.—The work of the Horticultural Division is developing rapidly and this year another Assistant was provided in the person of Mr. F. E. Buck, B.S.A., a graduate of the Macdonald College, P.Q., and a specialist in Landscape Gardening. Mr. Buck's work will consist mainly in experimental work with ornamental plants at the Central Experimental Farm, and assisting in planning the ornamental grounds at the Branch Farms. He will also do whatever other work seems best in promoting a greater love for ornamental plants among Canadians and encouraging the beautifying of farmers' homes.

During the past year some marked changes were made on the ornamental grounds at the Central Farm. The old rose plantation, which had been a prominent object on the main lawn but which had seemed out of place there, was removed and a new rose garden planted where the different varieties will be tested. A herbaceous perennial border 450 feet long and 12 feet wide which had been tiled in the autumn of 1910 for sub-irrigation, was planted in the autumn of 1911 and will be an attractive and conspicuous feature along the northern boundary of the main lawn. The ground about the sample hedges, which had been cultivated in previous years and was unpleasant to walk over when the ground was wet, was seeded down to lawn grass. A strip will be left at each side of the hedges for cultivation.

A new vineyard, of about one acre, was set out in the autumn as it will shortly be necessary to remove the old vineyard so that the land may be used for other purposes. A piece of land, of about seven acres, hitherto in the Agriculturist's Division, was transferred to the Horticultural Division in the autumn of 1911 and will be used for experiments with vegetables.

The office work has greatly increased during the past year. The number of letters received and despatched has about doubled. The work in preparing the accounts is considerable, and the work in keeping a record of the experiments in progress and the stock on hand and needed on the branch Farms has been heavy.

Branch Farms.—In my capacity as Dominion Horticulturist wherein I am to visit the Branch Experimental Farms and Stations and discuss with the Superintendents the experiments being conducted with fruits, garden vegetables, forest and ornamental trees, shrubs, and herbaceous plants and to assist them in any other way in my power, I have, I think, been able during the past year to render some service. I also beg to state that the change in my duties and the broadening of them has made a great difference in the kind of work done by me. Owing to my long absences from home in visiting the branch Farms it has been necessary to

delegate to my assistants most of the details in connection with the experimental work at the Central Experimental Farm with which I was intimately connected for twenty-three years, and when I am home I find that the administrative work of the Division, covering now as it does the Central Farm and Branch Farms, Stations and Sub-stations to the number of twenty-five, occupies a large part of my time and it is scarcely necessary to state this new work means a greatly increased responsibility.

During the year, I visited the Experimental Farms at Brandon, Indian Head, Rosthern, Scott, Lacombe, and Lethbridge, once each; the Station at Cap Rouge, four times; Nappan, twice; Charlottetown, twice; and Kentville, three times. At the Experimental Station at Scott I planned the horticultural grounds with the Superintendent and assisted in planting the first apple trees, plum trees, small fruits and ornamental trees and shrubs there. Hitherto the prairie about Scott had been treeless. At Rosthern and Lacombe I also assisted in planning and planting additional areas at these comparatively new Stations. At Brandon, Indian Head and Lethbridge I conferred with the Superintendents in regard to the work in horticulture and made any suggestions which seemed necessary. At Cap Rouge, Que., a new Station, I planned with the Superintendent the laying out of the orchards, small fruit and vegetable plantations and ordered the material for these, and my Assistant, Mr. T. G. Bunting, superintended the planting of the trees. Mr. F. E. Buck, my other Assistant, has prepared a plan for the ornamental grounds there, and it is hoped they will be planted this year. At Kentville, N.S., I suggested the area to be devoted to horticulture, and, as no Superintendent had been appointed, I ordered at the proper time for the area to be planted in 1912, the necessary trees. I also had seed of some of the best varieties of winter apples sown there, looking to the growing of an orchard of seedling trees. At Charlottetown, P.E.I., and Nappan, N.S., I conferred with the Superintendents in regard to the work and made what suggestions seemed desirable.

As the past year was practically the beginning of my work as Dominion Horticulturist, and as I found there were many things which it seemed desirable to change or improve in connection with experimental work in horticulture at the branch Farms, I beg to submit a statement of some of the more important changes made and the suggestions given.

1. Planned and installed at the Central Experimental Farm a system of card indexes specially adapted for keeping a record of the varieties of fruits, vegetables, flowers, ornamental trees and shrubs, and herbaceous plants being tested at the various branch Experimental Farms and Stations, in order that we might readily know what was being grown and what was needed. In order to simplify the work of keeping the records, each Experimental Farm and Station is designated by a numeral.

2. Devised special field and permanent record books for use at the branch farms and stations for keeping records of the behaviour of the varieties of fruits, vegetables, flowers, ornamental trees and shrubs, and herbaceous plants, and for recording results of experiments; also suggested methods of keeping records in same.

3. Instituted a system of allotting to each variety, or individual plant, an identification or record number by which the history of that variety or plant can be readily traced.

4. In experiments with varieties of vegetables it was suggested that they be grown on the same sized plots, with the plants the same distance apart, at each of the Farms, for the purpose of comparing results, one Farm with another. The size of the plots and distances apart of rows were adopted after referring to the Superintendents.

5. Weekly report blanks to be used at each Farm for recording information likely to prove valuable for reference at each Farm, and for reporting weekly to the Central Farm, were supplied to the Superintendents and are being used by them.

6. The filing of correspondence at the Central Farm has been better systematized so that the letters in connection with the branch Farms, and in fact with all correspondents, may be referred to promptly and the letter desired found.

7. Uniform abbreviations were suggested in recording notes, as in the past these had varied considerably and were sometimes puzzling.

8. Uniform wooden stakes for labelling small fruits, so that the names can be readily seen, have been suggested for the branch Farms.

9. A system of labelling which will enable the Superintendents to readily keep a record of the ornamental trees, shrubs, and herbaceous plants, has been adopted.

10. Selection of labels considered the best for permanency, legibility, neatness and cheapness, with suggestions and notes on labelling and style of lettering, furnishing examples.

11. Furnishing the branch Farms with seedling apple trees for test, with the object of obtaining desirable hardy sorts, and offering suggestions as to planting and care of the seedlings sent.

12. Distribution from the Central Farm of different varieties of specially selected strains of vegetables.

Furnishing the branch Farms with seed of specially selected strains of vegetables developed at the Central Farm for growing for distribution.

In addition to the changes made in the horticultural work and the suggestions given, we have continued to order for and supply the branch Farms with most of the fruit trees and bushes and ornamental trees, shrubs and herbaceous plants which it was desired to have tested at these Farms. The flower and vegetable seeds and labels have also, as in the past, been supplied mainly through the Central Farm.

MEETINGS ATTENDED AND ADDRESSES GIVEN.

A number of meetings were attended during the year and addresses given at most of them. At the summer meeting of the Quebec Pomological Society, held at Inverness, Que., on August 29-30, 1911, an address was given on 'Planting an Orchard.' At the annual meeting of the New Brunswick Fruit Growers' Association, at St. John, N.B., on November 1, I gave an address on 'Characteristics of Varieties of Apples Grown in New Brunswick.' For the annual meeting of the Ontario Fruit Growers' Association, at Toronto, November 15-16, 1911, I prepared and read the report on 'New Fruits,' and also gave an address on 'Fruit Growing in Nova Scotia.' For the annual meeting of the Ontario Horticultural Society, at Toronto, November 16-17, 1911, I prepared and read the Report on Novelties, and also read a paper on 'The Best Spiraeas.' At the annual meeting of the Ontario Vegetable Growers' Association, at Toronto, November 15, 1911, I gave an address on 'What the Central Experimental Farm is doing for Vegetable Growers.' I read a paper on 'New and Little Known Fruits,' at the annual meeting of the Quebec Pomological Society, Macdonald College, Que., December 5-6, 1911. At the annual meeting of the American Breeders' Association, held at Washington, D.C., U.S., December 28, 1911, I read a paper on 'Apple Breeding in Canada,' and on December 29, 1911, in the same city, read a paper on 'Characteristics of McIntosh Apple Seedlings,' before the Society for Horticultural Science at its annual meeting. At this meeting I was elected president of the Society for Horticultural Science for 1912. I attended the meeting of the Nova Scotia Fruit Growers' Association at Wolfville, N.S., on January 8-9, 1912, and gave an address on 'Work of an Experimental Fruit Station with Especial Reference to the Experimental Station at Kentville, N.S.,' and 'Is Apple Growing being Overdone.' At the Short Course in Horticulture at Macdonald College, Que., I addressed the students on 'Orchard Problems' on January 29, 1912, and on February 14, I read a paper before the Dominion Fruit Conference, Ottawa, on 'New Fruits.'

My assistant, Mr. T. G. Bunting, attended the field meeting of the South Renfrew Farmers' Institute at Burnstown, Ont., on June 14, 1911, where he gave a talk on 'Apple Growing.' He also attended the annual meeting of the Quebec Vegetable Growers' Association, at Cartierville, Que., on January 17, 1912, where he gave a paper on 'Better Methods in Vegetable Growing.'

DONATIONS DURING THE CALENDAR YEAR 1911.

SENDER.	DONATION.
Adney, Tappan, Upper Woodstock, N.B.	Apple scions, Pear scions, Seed of improved tomato.
Adams, E. E., Leamington, Ont.	Seed Selected Earliana tomato.
Burpee, W. Atlee, Philadelphia, Pa., U.S.	Seeds of leading specialties.
Bramball, G. H., Lloydminster, Sask.	Seed Walkley Champion Celery.
Cooke, Walter J., Cataraqui, Ont.	Seed of Early Corn .
Crow, Prof. J. W., O.A.C., Guelph, Ont.	Seed O.A.C. Strain Clipper, Industry, Sparks Earliana and Wealthy tomatoes.
Colpitts, Walter, Point de Bute, N.B.	New Potato.
Cross, D. J., Maidstone, Sask.	Sample of Pea seed.
Criddle, Norman, Treesbank, Man.	Seeds Lithospermum canescens.
Devlin, R. B., 36 Bonanza, Dawson.	Potato.
Faull, Prof., Toronto University, Toronto, Ont.	Seeds Lindera megaphylla
Heikel, B. W., Hameenlinna, Tavastehus, Finland.	Plum scoins, 6 varieties, 1 variety Plum scions, 1 variety Crab Apple scions.
Hansen, Prof., S. D., Brookings, S.D., U.S.	Plum scions, 8 varieties.
Hilborn, J. L., Leamington, Ont.	Seed of Tomato.
Hutchison, A. F., Swan River, Man.	Potato, May Flower.
Jack, N. E., Chateauguay Basin, Que.	Scions Grimes Golden apple.
Johnson's Nurseries, Campbellford, Ont.	Scions Johnson's Seedling apple.
Judge, Wm., Orangeville, Ont.	Apple scions, Plum scions.
Jenewin, Jos., Samen-Handlung, Innsbruck, Austro-Hungary.	Seed Tyrolese Larch.
Kelver, N. D., Spring Bourne, Man.	Potato.
Kilpatrick, J., Ottawa, Ont.	Plum scions.
Keyes, P. G., Ottawa, Ont.	Scions Seek-no-Further apple.
Lawrence, S. A., Upper Stewiacke, N.B.	Seeds Melons, water and musk.
Leech, Daniel, Salmon Arm, B.C.	Scions Yellow Newtown Pippin apple.
Pay, A., St. Catharines, Ont.	Pear scions.
Phipps, R. C., Collbran, Col., U.S.	Seed corn and citron.
Rich, N., Mannville, Alta.	Potato, Earliest of All.
Robertson, Geo., St. Catharines, Ont.	Seed Selected Sparks Earliana tomato.
Solaway, Ben P., Halcyonia, Sask.	Potatoes, 9 varieties.
Sherrington, A. E., Walkerton, Ont.	Improved Express tomato, Scions Snitzler plum.
St. George's Nursery Co., Harlington, Middlesex, England.	Seed Cyclamen, Calceolaria, Primula.
Teilbein, T., Millet, Alta.	Gooseberries: Red, Skunk; Native Spruce.
Trew Bros., Fortier, Man.	Unknown potato.
Tait, David, Iron Bridge, Ont.	Scions Muskoka Beauty apple.
Taylor, W. R., Aylmer, Que.	Scions Peter apple.
Walker, J. P., Wyers Brook, N.B.	Seed potatoes.
Williams, Thos., Duck Lake, Sask.	Peas, very early variety.

ACKNOWLEDGMENTS.

It is with much pleasure that I again take this annual opportunity of acknowledging the help received during the past year, not only from those directly connected with the Horticultural Division at Ottawa, but from that larger number of men interested in horticulture and its development throughout Canada, Great Britain, the United States and other countries. From many sources and individuals I have received help and encouragement which have been of great assistance in enabling me to carry out my work and plans for the progress of Horticulture in Canada. I wish especially to thank the Superintendents of the Branch Farms and Stations for their kind co-operation and readiness to carry out the suggestions

which I have made in regard to the horticultural work on the farms under their charge. Without this spirit of co-operation the help I should be able to render would be much lessened.

At Ottawa I am fortunate in having associated with me men who are interested in their work, for without this interest the quality of the work would be likely to suffer. My Assistants, Mr. T. G. Bunting and Mr. F. E. Buck, have been able to relieve me of a large part of the detail work connected with experiments, the former in regard to fruits and vegetables, and the latter in regard to ornamental plants. Mr. Bunting has also acted in my place when I have been absent from home and has shown good judgment. The Secretary of the Horticultural Division, Mr. J. F. Watson, has had a great increase in responsibility during the past year on account of the work connected with the branch Farms, in connection with the accounts and in regard to the correspondence, which has about doubled. He has not only done his work thoroughly, but has greatly improved the system of keeping the correspondence. Mr. H. Holz, Foreman, has continued to render good service. Much of the success of the outside work depends on him. Mr. W. T. Ellis has continued in charge of the greenhouse and has done his work with his accustomed thoroughness. Mr. Horace Read, Assistant Foreman, continued to aid in the experimental work from spring until winter, but during the past winter has done good work in transferring the records of the branch Farms to the Central Card System here. To the other men on whom, though in less responsible positions, it is necessary to rely for most of the manual work outside, I wish to express my appreciation of the work done by them.

I have the honour to be, sir,
Your obedient servant,

W. T. MACOUN,
Dominion Horticulturist.

CHARACTER OF SEASON.

On the 12th of April, 1911, the frost was out of the ground and the soil dry enough to dig in some parts of the nursery at the Central Experimental Farm. During the past thirteen years a record of this kind has been kept and the average possible date for digging for that period is April 11.

The month of April was cool, on the whole. The highest temperature was 81·2° F. on the 29th, and the lowest 3·6° F. on the 4th. The rainfall was light. May was a warm month. There were four extremely hot days for May when the temperature rose above 90° F. The two hottest days were the 21st and 22nd, when the thermometer registered 93·8° F. and 93·9° F., respectively. On thirteen days the temperature was over 80° F. There was comparatively little rain during the month. Owing to extremely hot, dry weather the blooming period for fruits was shortened very much, the apple trees only being in bloom for from three to four days. The blooming of bulbs was unsatisfactory owing to the hot weather, and the lilac season was much shortened. Seed of American elm was ripe on the 26th, and Silver Maple on the 30th. Vegetation was much further advanced than usual at the end of the month. The last spring frost was recorded on May 4, when the temperature was 24° F. June was a moderately warm month. The highest temperature was on the 27th, when it was 88° F., and the lowest was 46·8° F. on the 4th. During the month the growth of most things was very rapid as there was sufficient moisture, but plants requiring high temperature did not make much growth, as the nights were cool.

July was an extraordinarily hot month, one of the hottest ever experienced in Ottawa. The temperature was over 90° F. on eight days and over 80° F. on twenty days. The highest temperature was 97·8° F. on the 3rd. The mean temperature for the month was 71·46° F. Many nights were very warm. The rainfall was light in July. August was another very hot month. The temperature was over 90° F. six times, and 80° F. for over twenty times. The hottest day was the 1st, when the record was 97·6° F. The mean temperature for the month was 70·31° F. The rainfall was light in August and the ground remained very dry throughout the month. Potato foliage became much dried up owing to tip burn, rhizoctonia disease, and general lack of vigour. Apples dropped badly and ripened too fast. Sweet peas would not bloom, and leaf hoppers and red spider were very abundant. September was a moderately warm month. The highest temperature was 80·8° F. on the 1st, and the lowest 28·8° F. on the 14th. This frost killed tender plants, such as potatoes, melons tomatoes, tender annuals, etc. Geraniums were badly injured on some parts of the grounds, the stems being frozen to near the ground, while on other parts the stems were not hurt. The flowers of *Hydrangea paniculata grandiflora* which were in fine condition before the frost were badly injured. The ground which had become too dry early in July did not receive sufficient moisture until after the middle of September. October was a fine, moderately warm month. The highest temperature was 72·0° F. on the 4th, and the lowest 23·6° F. on the 28th. There had been no frosts to injure hardy annuals from September 14 until this date and they had been blooming well during that time. The first heavy fall of leaves of ornamental trees occurred on October 17. The weather during most of November was mild. The highest temperature was 60° F. on the 12th, and the lowest 5·8° F. on the 17th. The first two weeks of the month were mild, with little or no frost in the ground, but on the 14th there was a snow storm of a few inches, sufficient to make fair sleighing, and winter may be said to have set in on November 15, with but little frost in the ground. The average date that winter has set in for the past fourteen years is November 24. By December 2, there was about a foot of snow on the ground but little frost in it, but by the 11th the snow and frost had both gone. On the 14th, the strawberries were covered with straw the snow having come so early in November that they had not been covered before. On the 15th, about six inches of snow fell on unfrozen ground, making sleighing again. The highest temperature in December was 51·6° F. on the 11th, and the lowest 3·6° F. below zero on the 20th. It was only twice below zero during the month, which was a very mild one. The month of January was a great contrast to December, and cold weather set in on the 3rd. The temperature only rose above freezing on one day during the month, namely, on the 19th, when it was 36·4° F. The lowest temperature of the month and the lowest of the winter was 26·2° F. below zero on the 13th. During the month the temperature was below zero on seventeen days, and below 20° F. below zero on four days. By the end of the month there were about fifteen inches of snow on the ground, but there had been less in the early part of the month and the frost went down very deep. February was also a very cold month, and while the temperature rose slightly above freezing on five days there was little thawing. The lowest temperature was 24·0° F. below zero on the 10th. The temperature during the month was twice below 20·0° F. below zero, and 12 times below zero. There were several snowstorms during the month and by the end of it there was about two feet of snow on the ground. The first half of March was cold for that month. For the first six days the temperature went several degrees below zero every day, on the 6th it was 17·0° F. below zero, the coldest day of the month. It was below zero seven times in March. The snow went very little until the 27th, when it began to go rapidly and by March 31 there was about one foot in most places, but ground showing in spots.

While the past winter was a very cold one it was not nearly so severe as the winter of 1903-4, when December, January, and February were all very cold months and the temperature went below zero on 58 different times, compared with 38 during the past one.

FRUIT AND VEGETABLE CROPS.

The only part of Canada where there was a heavy crop of apples in 1911 was in the Annapolis Valley and adjacent valleys of Nova Scotia, where a crop much above the average was harvested. The fruit was better matured and higher coloured than usual and practically free of apple scab. Some varieties were undersized owing to the drought. There was a good crop of apples in Prince Edward Island, especially of the earlier varieties. The crop of early apples in New Brunswick was also good; the main crop of apples, however, was below the average. Early apples were a medium to good crop in Quebec and Eastern Ontario. The crop of Fameuse was however, light. McIntosh gave a medium crop. In other parts of Ontario the crop ranged from light to good, there being considerable difference in varieties, larger crops being usually among the earliest sorts. The crop, on the whole, was below medium, but was practically free of scab. In British Columbia the apple crop was light on Vancouver Island and the lower mainland, but medium in the Okanagan and other inland valleys. Pears, plums, and peaches were a medium crop in Ontario. Pears were a light crop on Vancouver Island and the lower mainland of British Columbia, but medium to good in the inland valleys. Grapes were a good crop in Ontario. The small fruit crop in the provinces of Ontario and Quebec was light in 1911 owing to the severe drought and hot weather. In the Maritime provinces the crop was better, but was light in some parts.

The potato crop was a very poor one in the provinces of Ontario and Quebec on account of the extremely hot weather and protracted drought. In the Maritime provinces the crop was a medium one, and a good one in the Prairie provinces and parts of British Columbia.

The tomato crop was reduced very much in the province of Ontario owing to the extreme drought. Other vegetables were not up to the average for the same reason.

At the Central Experimental Farm there was a medium crop of apples, and of Americana and Nigra plums, but no European plums. There were no cherries in 1911. The crops of currants, gooseberries, and raspberries were only medium, and the strawberry crop was light, mainly owing to spring frosts injuring the flowers.

There was only a medium crop of grapes, but the fruit ripened well owing to the long, warm autumn without severe frosts. The potato crop was very poor owing mainly to the drought and to the rhizoctonia disease. The tomato crop was also light. Peas were a poor crop, and most other vegetables suffered considerably owing to the long-continued hot, dry weather.

SEEDLING FRUITS RECEIVED FOR EXAMINATION, 1911-1912.

The number of good fruits originating in Canada is increasing every year. Some of the best commercial varieties are of Canadian origin and we believe that within the next twenty-five years a much larger proportion of the fruits offered for sale by Canadian nurserymen will be from that source. During the past twenty-four years many very promising new fruits have been sent to the Horticultural Division for examination. Where possible, scions or plants of these have been

obtained and tested. During the past year a number of seedling fruits have been received, of which a record is given below. Full descriptions follow of those considered most promising.

Record Number.	
545	Seedling apple, from J. W. Johnston, Campbellford, Ont. (see full description).
546	Seedling apple, "Aurora," from T. W. Gibbs, Aurora, Ont., (see full description).
547	Sport (?) of St. Lawrence apple, "Billings", from Miss Bertha Billings, Brockville, Ont., (See full description).
548	Seedling apple from W. H. Smith, Port Dover, Ont., (see full description).
549	Seedling apple from W. H. Smith, Port Dover, Ont.
550	Seedling apple from W. H. Smith, Port Dover, Ont.
551	Seedling apple No. 1., from C. L. Stephens, Orillia, Ont.
552	Seedling apple from Alex. McNeill, Ottawa, Ont.
553	Seedling apple from Wm. Moore, Milton, Ont. (received in 1910).
554	Seedling of Whitney crab, from H. G. G. Schmidt, Madawaska, Ont.
555	Seedling apple, from H. G. G. Schmidt, Madawaska, Ont.
556	Seedling apple, from H. G. G. Schmidt, Madawaska, Ont.
557	Seedling apple, from Peter Collyer, South Bay, Ont., (see full description).
558	Seedling of Duchess apple, from Geo. Malcolm, Shanty Bay, Ont., (see full description).
559	Seedling of Wealthy apple, from Geo. Malcolm, Shanty Bay, Ont.
560	Seedling apple, from Geo. Bowman, Spring Valley, Ont.
561	Seedling apple, from Millen Gibson, West Dalhousie, N.S.
562	Seedling apple, "Shaffner," from, A. S. Hunt, Lawrencetown, N.S. (see full description).
563	Seedling apple "Leonard," from New Brunswick, per T. W. Bowman & Sons, Ridgeville, Ont., (see full description).
564	Seedling apple "Keen's Red," from Alfred Keen, St. Mary's Ferry, York Co., N.B., (see full description).
565	Seedling apple, from J. B. Williston, Baie du Vin, N.B.
566	Seedling crab apple, from A. G. Turney, Fredericton, N.B.
567	Seedling of Alexander apple, from G. S. Gilbert, Burton, N.B.
568	Seedling of Fameuse apple, from G. S. Gilbert, Burton, N.B., (see full description).
569	Seedling apple, from Mrs. Samuel Robinson, Grand Bay, N.B.
570	"Summer Harvey" apple, from Tappan Adney, Upper Woodstock, N.B., (see full description).
571	"Sharp's Sweet crab apple," from Tappan Adney, Upper Woodstock, N.B.
572	"Mark No. 10" apple, from Tappan Adney, Upper Woodstock, N.B.
573	"Mark No. 51" apple, from Tappan Adney, Upper Woodstock, N.B.
574	"Mark No. 53" apple, from Tappan Adney, Upper Woodstock, N.B.
575	"Mark No. 55" apple, from Tappan Adney, Upper Woodstock, N.B.
576	"Mark No. 93" apple, from Tappan Adney, Upper Woodstock, N.B.
577	Seedling apple, from R. J. Wiggins, Elmside, Que.
578	Seedling apple, from Louis Gervais, Lawrenceville, Que.
579	Seedling apple, from Jas. T. MacMillan, Penticton, B.C.
580	Seedling peach, from D. Robertson, Oakville, Ont.
581	Seedling plum, "Warren No. 1," from W. Courtneidge, Starbuck, Man., (see full description).
582	Seedling plum, "Warren No. 2," from W. Courtneidge, Starbuck, Man.

545. Seedling apple from J. W. Johnston, Campbellford, Ont.—Above medium size; roundish, ribbed; cavity deep, open; stem very short, stout; basin deep, medium width, wrinkled; calyx closed; colour yellow well washed and splashed with crimson, approaching orange-red; predominant colour crimson; seeds below medium, plump, acute; dots few, white distinct; skin moderately thick, tender; flesh dull white, crisp, moderately juicy; core medium size; subacid, pleasant flavour; quality good; season November, probably to January.

An attractive looking apple.—About same season as McIntosh, evidently. On this account would not be as useful as it otherwise might be. Not juicy enough for best dessert purposes. Should, however, ship better than McIntosh.

546. Seedling apple from T. W. Gibbs, Aurora, Ont.—Above medium size to large; roundish conical, slightly oblate; cavity deep, moderate width, regular, green; stem rather short, moderately slender; basin deep, wide, large, regular, slightly wrinkled; calyx partly open; colour greenish yellow, washed with light red, splashed heavily with crimson; predominant colour crimson; seeds rather large, acute; dots few, small, whitish; skin moderately thick, brittle; flesh yellow-white, slightly tinged with red, moderately juicy, moderately tender; core medium, flavour moderately mild, subacid; quality above medium to almost good; season mid August to mid September.

A very attractive apple, somewhat resembling the Duchess in outward appearance, but not quite so acid in flavour.

547. Billings (Red) Apple.—Above medium; oblate; cavity open, deep; stem short to medium, moderately stout; basin deep, open, wrinkled; calyx closed; colour yellow almost entirely covered with deep crimson; predominant colour deep crimson; seeds medium size, acute; dots moderately numerous, white and bluish, distinct; skin thick, moderately tender; flesh white with traces of red to core line, tender, juicy; core, medium; subacid, pleasant flavour; quality good to very good; season late September, probably to mid-October.

A handsome apple, much like St. Lawrence in flesh and flavour, but more highly coloured.

548. Seedling apple from W. H. Smith, Port Dover, Ont.—Large; roundish conical, ribbed; cavity deep, open; stem short, stout; basin deep, medium width, wrinkled; calyx open; greenish-yellow, well splashed and washed with crimson; predominant colour crimson; seeds medium size, dark, acute; dots few, yellow; skin thick, tough; flesh yellowish with traces of red, tender, moderately juicy; core medium size; subacid, pleasant, quite pear-like flavour; quality good; season evidently early to mid-winter.

Resembles Northern Spy very much in outward appearance, but not as good in quality as Spy, hence not specially promising unless hardier and an earlier bearer.

557. Seedling apple, possibly of Gravenstein, from Peter Collyer, South Bay, Ont.—Medium size; oblate, sightly conical, angular; cavity moderate depth and width, russeted; stem medium length, slender; basin moderate depth and width, wrinkled; calyx almost closed; deep yellowish, washed with orange red, splashed with crimson; predominant colour yellowish; seeds medium to small, obtuse; dots rather obscure, few; skin thick, tough; flesh yellowish, moderately juicy, tender; core rather small, mildly subacid, pleasant flavour; quality good; season September to October.

Resembles Gravenstein in outward appearance considerably. Quality good.

558. Duchess Seedling apple from Geo. Malcolm, Shanty Bay, Ont.—Medium to above in size; oblate, slightly conical; cavity rather deep and wide; stem moderate length, moderate thickness; basin rather deep, moderate width; calyx closed; colour pale yellowish-green, washed with bright red, splashed with crimson; predominant colour crimson; seeds medium, plump, acute; dots few, large, distinct, yellowish; skin thin, tender; flesh white, juicy, tender; core small; mildly subacid flavour; quality above medium; season late August to mid-September.

Resembles Duchess considerably in outward appearance and in season, but is much tenderer in flesh and milder in flavour.

562. Shaffner Apple.—Very large; roundish, ribbed; cavity deep, open; basin deep, open, wrinkled; calyx open; colour yellow, well splashed and washed with attractive orange red; predominant colour orange red; seeds above medium, obtuse; dots few, grey, distinct; skin moderately thick, tender; flesh yellowish with traces of red next basin, coarse, crisp, juicy; core medium size, open; subacid, not much flavour; quality above medium to good; season evidently early to mid-winter.

A good seedling, about 8 years old. Grew in a fence row. A large, handsome apple. Probably a seedling of Tompkins King, from appearance.

563. Leonard Apple, from New Brunswick, per Thos. Bowman & Son, Ridgeville, Ont.—Very large; roundish, conical; cavity deep, moderate width, regular; basin moderate depth and width; calyx open; colour yellowish-green, almost entirely washed with attractive crimson, splashed with dark crimson; predominant colour attractive crimson; seeds large, long, obtuse; dots few, very large, distinct, greyish; skin thick, moderately tough; flesh creamy-white, moderately juicy, rather coarse; core above

medium; mildly subacid flavour; quality about medium to above medium; season late September to probably November.

A very large, attractive apple slightly resembling the Baxter, also the King, but earlier than King. Flavour and quality are not good, but otherwise a desirable apple.

564. Seedling apple from Alfred Keen, St. Mary's Ferry, York Co., N.B.—Medium size; roundish conical; cavity medium depth and width; stem moderate length, moderately stout; basin deep, medium width, wrinkled; calyx closed; colour greenish-yellow well washed with deep crimson; predominant colour deep crimson; seeds large, acute; dots moderately numerous, yellow, indistinct; skin moderately thick, tender; flesh white, tinged with red, tender, juicy; core medium size; subacid, pleasant, slightly astringent flavour; quality good; season evidently September to early October.

Growing in a field without cultivation. A highly coloured apple of the Fameuse type. Originator desires to call it Keen's Red.

565. Fameuse seedling from G. S. Gilbert, Burton, N.B.—Above medium to large in size; oblate; cavity medium depth and width; stem medium length, stout; basin deep, medium width, wrinkled; calyx partly open; colour pale yellow well washed with attractive crimson; predominant colour crimson; seeds medium size, acuminate; dots few, white, indistinct; bloom pinkish; skin moderately thick, moderately tough; flesh very white, crisp, tender, juicy; core below medium; subacid, pleasant, spicey, pear-like flavour; quality good; season evidently late October to January. Resembles Fameuse in whiteness of flesh.

Said to be a seedling of Fameuse. A handsome apple, but not as good as either McIntosh or Fameuse. Should be useful if a better keeper or hardier than McIntosh or Fameuse.

570. Summer Harvey apple.—Medium size; oblate to roundish; cavity open, shallow; stem short to medium, stout; basin medium width, shallow, wrink'ed; calyx closed; colour yellow, sometimes with a slight brownish blush on sunny side, green about cavity; predominant colour yellow; seeds medium size; dots obscure; skin moderately thick, tender; flesh yellowish, tender, juicy; core medium; subacid, pleasant flavour; quality above medium; season early August, perhaps late July.

Native of New Brunswick.

Season as early or earlier than Astrachan, earlier than Yellow Transparent, but not so early as Crimson Beauty.

581. Plum Seedling No. 1. Called Warren Seedling No. 1. From W. Courtneidge, Starbuck, P.O., Man.—Oval; medium size, 1⅛ x ⅞-inch; cavity medium size, medium depth; suture distinct, slightly depressed; apex slightly depressed with a small point off to one side; colour yellow, two-thirds overspread scarlet-crimson; dots moderately numerous, medium size, whitish with crimson rim; skin thin, tough; flesh yellowish-orange, medium firm, juicy; stone oval, almost free; flavour sweet, rich, pleasant, buttery; quality good;

A plum with a very good appearance and of good quality. Lacks in size. Should be of value for the west. Nigra (?) group.

APPLES ORIGINATED IN THE HORTICULTURAL DIVISION, CENTRAL EXPERIMENTAL FARM.

During the past eight years 997, or practically 1,000, new varieties of apples have fruited at the Central Experimental Farm, Ottawa, Canada. These all originated at this Farm and are natural seedlings of Fameuse, McIntosh, Shiawassee, Langford Beauty, Northern Spy, St. Lawrence, Winter St. Lawrence, Lawyer, Gano, Bullock (American Golden Russet), Swayzie, Wealthy, Salome, Scott (Winter), and others. These grew in a test orchard and were surrounded by many other varieties. Seed was saved from number one fruit in 1898 and later, and sown, and the seedlings after passing through the seed bed and nursery row stage were eventually

planted in the orchard 15 feet apart each way. The results have been surprising. More than three-fourths of the 1,000 varieties which have already fruited have been of marketable size and the proportion of really promising apples has been quite large. Of these 67 have been named.

Descriptions, in detail, have been made of the great majority of the seedlings which have fruited, whether the quality was good or poor, or whether the fruit was large or small.

This large number of descriptions has enabled us to ascertain what proportion of the seedlings of each mother parent resemble that parent in any or all of the marked characteristics of apples such as size, form, colour, flesh, flavour, season, etc., and also in what way, if any, the male parents, of which there must have been a considerable number of varieties, have impressed themselves on the seedlings. How many of the seedlings are from self-pollenized flowers we do not know. It may be stated in passing that in addition to this lot of seedlings we have several hundred trees from hand-crossed flowers of which both parents are known. Most of these, however, are younger trees than the natural crosses referred to above.

In the Report of the Dominion Experimental Farms for 1911, was published in tabular form the main characteristics of 581 of these seedlings and the percentage of the seedlings which have certain characters. The marked characteristics of the seedlings from each female parent were summarized in paragraph form. One of the striking things is that apples of good quality or flavour give a large proportion of seedlings of good quality with the exceptions of Fameuse and American Golden Russet, which have been very disappointing in this respect. The absence of flavour in Gano has impressed itself on the seedlings and few of them are more than medium in quality. The good quality and high flavour in the seedlings of Northern Spy and McIntosh are particularly remarkable in that both of them are self-sterile, at least, we believe, at Ottawa, and they must have been pollenized by other varieties though so far the influence of the male parents has not been sufficiently evident for us to decide on what they were.

There were 656 varieties of these seedlings fruited in 1911 of which 276 varieties fruited for the first time.

Following are descriptions of 19 named seedlings not hitherto described in the Experimental Farm reports.

Albert (Winter St. Lawrence Seedling).—Fruit medium size; roundish, regular; cavity medium depth and width; stem short, stout; basin deep, medium width, wrinkled; calyx open; colour yellow, well washed and splashed with deep red; predominant colour, deep red; seeds medium size, acuminate; dots moderately numerous, white, distinct; bloom pinkish; skin moderately thick, tough; flesh white, firm, crisp, tender, moderately juicy; core medium size; subacid, pleasant flavour; quality good; season late November, probably to February or later.

Resembles Winter St. Lawrence considerably in colour, flesh and flavour. Promising.

Atlas (Winter St. Lawrence Seedling).—Large; roundish; cavity deep, medium width; stem short to medium, moderately stout; basin narrow, deep, wrinkled; calyx partly open; colour pale yellow almost white, splashed and washed with carmine; predominant colour carmine; seeds medium size, acuminate; dots obscure; skin moderately thick, tender; flesh white with traces of red, tender, moderately juicy; core medium; subacid, pleasant flavour; quality good; season late October, probably to December.

Considerably like Winter St. Lawrence in outward appearance, flesh and flavour. More attractive than Winter St. Lawrence and about same season.

Caruso (McIntosh Seedling).—Large; roundish, conical, ribbed; cavity deep, open; stem short to medium, stout; basin narrow, medium depth, wrinkled; calyx

closed or partly open; colour pale yellow, well washed with attractive crimson; predominant colour crimson; seeds medium, obtuse; dots obscure; bloom pinkish; skin moderately thick, tender; flesh yellowish, crisp, tender, juicy; core medium size, open; subacid, pleasant flavour; quality good; season early September to November.

A handsome apple resembling McIntosh in colour and a little in flesh and flavour.

Cleaver (Salome Seedling).—Above medium size; oblong, conical, regular; cavity medium depth and width; stem medium length, slender; basin medium depth and width, wrinkled; calyx partly open; colour yellow, well washed and splashed with crimson, approaching orange red; predominant colour attractive crimson; seeds medium size, acute; dots few, yellow, distinct; skin moderately thick, tender; flesh yellowish, tender, buttery, moderately juicy; core large, open; subacid, pleasant flavour; quality good; season December to late winter.

Resembles Salome considerably in outward appearance, flesh and flavour. An attractive-looking apple.

Donald (Northern Spy Seedling).—Large; oblate, slightly ribbed; cavity deep, medium width, russeted; stem short, moderately stout; basin deep, medium width, wrinkled; calyx closed or partly open; colour yellow splashed and washed with crimson; predominant colour crimson; seeds medium size, acute; dots few, yellow, distinct; bloom pinkish; skin moderately thick, tender; flesh yellowish, crisp, tender, rather coarse, juicy; core medium; subacid, pleasant, sprightly, not high flavour; quality good; season late October, probably to mid-winter or late winter.

A handsome apple which yielded well this year. Resembles Northern Spy somewhat in colour and character of flesh.

Elmer (Northern Spy Seedling).—Medium to above in size; roundish; cavity deep, narrow, russeted at base; stem slender; basin deep, medium width, slightly wrinkled; calyx open; colour greenish yellow, well washed and splashed with deep crimson; predominant colour deep crimson; seeds medium size, acute; dots obscure; bloom pinkish; skin moderately thick, tough; flesh yellowish, crisp, tender, juicy; core medium size; subacid, pleasant, sprightly flavour; quality good; season January to late winter.

Looks and tastes considerably like Northern Spy. Flesh much like Northern Spy. Promising.

Garnet (McIntosh Seedling).—Above medium size; oblate, flattened at ends, prominently angular; cavity deep, open; stem short, stout; basin open, deep, slightly wrinkled; calyx closed or partly open; greenish yellow, washed with dull crimson; predominant colour dull crimson; seeds abortive 1910, also in 1911; dots obscure; bloom thin, pinkish; skin moderately thick, moderately tough; flesh dull white, tender, moderately juicy; core small, subacid, pleasant flavour; quality above medium to good; season December to late winter.

Gerald (Langford Beauty Seedling).—Medium to above in size; roundish; cavity medium depth and width; stem medium length, moderately stout; basin deep, medium width, wrinkled; calyx partly open; colour greenish yellow, washed with crimson; predominant colour crimson; seeds above medium size, acuminate; dots few, yellow, distinct; skin moderately thick, moderately tender; flesh white, tender, juicy; core medium; subacid, pleasant flavour; quality good; season late November probably to February or later.

An attractive-looking apple of good quality. Resembles Langford considerably in outward appearance, flesh and flavour.

Holz (Lawver X McIntosh).—Medium size; roundish; cavity open, medium depth, russeted; stem medium length, stout; basin deep, open, slightly wrinkled; calyx open; colour pale greenish-yellow, well washed with crimson; predominant

colour crimson; seeds large, acuminate; dots few, white, distinct; skin moderately thick, tender; flesh dull white, firm, crisp, juicy; core small, subacid, pleasant but not high flavour; quality above medium to good; season January to late winter.

Resembles Lawver very much in outward appearance, flesh, keeping qualities and in flavour. No marked resemblance to McIntosh.

Horace (Langford Beauty Seedling).—Above medium to medium in size; roundish conical, regular; cavity medium depth and width; stem medium length, slender to moderately stout; basin deep, medium width, slightly wrinkled; calyx closed; colour pale yellow covered with rich crimson; predominant colour rich crimson; seeds medium size, acute; dots few, pale yellow, distinct; bloom very bluish; skin moderately thick, tough; flesh white, tender, juicy; core medium; briskly subacid, pleasant flavour; quality good; season early September to November.

Much like Langford Beauty in colour, shape, flesh, and flavour. May be a little later in season.

Joyce (McIntosh Seedling).—Medium size; oblate to roundish, ribbed; cavity medium depth and width; stem short, moderately stout; basin medium depth and width, wrinkled; calyx closed; colour yellow, washed and splashed with crimson; predominant colour crimson; seeds medium size, acute, dots few, yellow, distinct; skin moderately thick, tender; flesh dull white, tender, melting; juicy; core medium size, open; subacid, pleasant, aromatic flavour; quality good to very good; season October to November.

Resembles McIntosh very much in flesh and flavour. Earlier than McIntosh.

Marcus (Northern Spy Seedling).—Large, roundish, ribbed; cavity deep, open, russeted; stem short, stout; basin deep, open, slightly wrinkled; calyx partly open; colour greenish yellow, splashed, and washed with carmine; predominant colour carmine; seeds medium size, roundish, acute; dots moderately numerous, whitish, distinct; skin thick, moderately tough, flesh yellowish, crisp, tender; moderately juicy; core small, open; quality good; season October probably to December.

Does not resemble Northern Spy in outward appearance, but flesh and flavour are very much like Northern Spy.

Monitor (Langford Beauty Seedling).—Large; oblate; cavity open, medium depth; stem short, stout; basin open, medium depth, wrinkled; calyx partly open; colour greenish yellow, well washed and splashed with deep crimson; seeds medium size, obtuse; dots few, whitish, distinct; flesh white, crisp, tender, juicy; core small; subacid, pleasant flavour; quality good to very good; season September and perhaps later.

Resembles Langford somewhat in colour and flesh and flavour. Flavour is Fameuse-like. Promising.

Nemo (McIntosh Seedling).—Medium size; oblate to roundish; cavity open, medium depth; stem medium length, stout, slightly ribbed; basin deep, open, wrinkled; calyx open; colour yellow, well washed with attractive crimson; predominant colour attractive crimson; seeds medium size, acute; dots few, yellow, indistinct; skin moderately thick, tough; flesh yellowish, tender, juicy; core small; subacid, pleasant flavour; quality good; season November, probably to February.

A handsome apple of good quality. About the season of McIntosh, but may be a better keeper. Resembles McIntosh in colour and in flesh.

Nestor (Northern Spy Seedling).—Medium size; roundish; cavity deep, medium width russeted; stem short, moderately stout; basin deep, medium width; nearly smooth; calyx open; colour yellow, washed with attractive crimson; predominant colour crimson; seeds above medium, acute; dots few, yellow, distinct; skin moderately thick, tender; flesh yellowish, crisp, tender, juicy; core small; briskly subacid, pleasant flavour; quality good; season probably November to January.

Resembles Northern Spy considerably in outward appearance, flesh and flavour. Perhaps a trifle small.

Nile (Winter St. Lawrence Seedling).—Medium size; roundish, regular; cavity medium depth and width; stem short, stout; basin deep, medium width, wrinkled; calyx closed; colour yellow, splashed and washed with deep red; predominant colour deep red; seeds medium size, acuminate; dots few, white, distinct; skin moderately thick, tough; flesh white, tender, moderately juicy; core medium; subacid, pleasant flavour; quality good; season November to January or February.

Much like Winter St. Lawrence in outward appearance, flesh and flavour.

Rondo (Salome Seedling).—Small, about the size of Martha crab; roundish to oblate; cavity medium depth and width; stem very long, slender; basin open, shallow; calyx closed; colour yellow, practically all covered with attractive crimson; predominant colour attractive crimson; dots few, yellow, distinct; flesh deep yellow, crisp, breaking; core medium size, open; briskly subacid, little flavour; quality medium to above; season December to perhaps later.

A winter crab apple of handsome appearance. Crab characteristic in stem, skin, flesh and flavour. No resemblance to Salome.

Sandow (Northern Spy Seedling).—Medium size; roundish, ribbed; cavity open, deep; stem short, slender; basin deep, medium width, smooth; calyx closed; colour yellow, well washed with deep crimson; predominant colour deep crimson; seeds medium size, acute; dots few, white, distinct; skin moderately thick, tender; flesh yellowish, crisp, tender, juicy; core medium size, open; subacid, sprightly, pleasant flavour; quality good; season December to late winter.

Resembles Northern Spy somewhat in outward appearance, and in character of flesh and flavour.

Service (McIntosh Seedling).—Medium to above medium in size; roundish conic, ribbed; cavity shallow, medium width; stem short, stout; basin narrow, medium depth; calyx open; colour pale green, washed and splashed with crimson; predominant colour crimson; seeds medium size, plump, elongated at one end; dots few, pale, indistinct; skin moderately thick, moderately tender; flesh white, very tender, fine grained, juicy; core medium subacid, pleasant flavour; quality good; season late November, probably to mid-winter or later.

Resembles McIntosh considerably in outward appearance and in flesh. Flavour is somewhat like Fameuse, but is sprightlier. Promising.

Tasty (Northern Spy Seedling).—Medium to above in size; oblate conic; cavity deep, open, russeted; stem short, stout; basin deep, medium width, wrinkled; calyx closed; colour yellow, washed and splashed with bright crimson approaching orange-red; predominant colour bright crimson; seeds medium size, acute; dots moderately numerous, yellow, distinct; bloom bluish; skin thick, tough; flesh yellowish, tender, juicy; core medium size; subacid, spicy, pleasant flavour; quality good; season October or later.

A handsome apple, slightly resembling Northern Spy in colour, and a little in flavour. Flavour is more like Sops of Wine. Promising.

THE MCINTOSH APPLE AND ITS SEEDLINGS ORIGINATED AT THE CENTRAL EXPERIMENTAL FARM.

The McIntosh apple is in our opinion, the best dessert apple of its season in America. It originated as a chance seedling on the McIntosh homestead, Matilda township, Dundas county, Ontario, Canada, with John McIntosh who found the tree with some others when clearing ground for his shack about 1797. Its dissemination was slow at first. The original tree was still living and bearing fruit until 1907, when a hail storm helped to kill it. It died in 1908, having been in very poor con-

dition for about four years previously due to a fire which scorched it, as it was growing near a building which was burned.

On account of its fine-grained, tender flesh, high flavour and attractive colour, which are characteristic of the Fameuse apple, it is thought to be a seedling of that variety, and while it is quite likely that the supposition is correct this is not certain. It has been demonstrated in the province of Quebec where Fameuse and McIntosh are growing in considerable numbers that the McIntosh tree is hardier than Fameuse, the latter variety having been in severe winters badly injured or killed outright, while the McIntosh has suffered much less. It should prove interesting to record that practically none of the McIntosh seedlings has been killed by winter at Ottawa, while quite a large proportion of Fameuse seedlings have died from winter injury. The season of McIntosh in that part of Ontario where it originated and in the province of Quebec is from October to February or even to March, a very long season. The Fameuse, on the other hand, has a comparatively short season, coming into condition about the same time as McIntosh but deteriorating rapidly after December. The McIntosh apple averages larger than Fameuse, yields as well, or better, and on account of its greater sprightliness or acidity the fruit is, we believe, liked by more people than the more mildly subacid Fameuse. No apple that we know of, with perhaps the exception of Wealthy, has reached as great a popularity, based on real merit, in as short a time as the McIntosh. So great is the demand for trees in Canada that the nurserymen cannot propagate rapidly enough, and we understand that in the eastern States somewhat the same condition is being experienced.

When seed of the McIntosh apple was planted in 1898 at the Central Experimental Farm, it was hoped that among the seedlings which would be grown there would be some which though not being superior to McIntosh in colour and flavour (as this seemed too much to be hoped for) would, perhaps, extend the season of apples of the McIntosh type, for while it has been said that McIntosh will keep until March in eastern Ontario and Quebec, in parts of the country where the autumn is warmer, and even in seasons in Quebec when it is warm, the McIntosh does not keep that long. In the seedlings which have fruited we have obtained apples of the McIntosh type in season as early as August 31, and others which are not in season until December and which will keep until spring.

The fruit of the McIntosh apple as grown at Ottawa has been described by the writer as follows:—

McIntosh.—Fruit, medium to above medium in size, roundish, slightly ribbed, highly perfumed; skin pale yellow, almost entirely covered with attractive crimson, usually darker on sunny side than on the other parts of the fruit; dots few, small, white, distinct but not prominent; skin thick, tough; cavity of medium depth and width, open; stem short, stout; basin narrow, almost smooth, medium depth to deep; calyx partly open; flesh white and yellowish, crisp, very tender, melting, juicy, subacid, sprightly with a pleasant aromatic flavour. Season October to February, but in best condition during November and December.

The characteristics of sixty seedlings of McIntosh as regards size, form, colour, cavity, stem, basin, calyx, seeds, dots, skin, flesh, core, flavour, quality, season, have been recorded and when a seedling resembles the mother parent in any of the main characteristics this has also been noted.

NOTE.—Apples under 1½ inches in diameter are called very small; between 1½ and 2¼ inches, small; 2¼ to 2½ inches, below medium; 2½ to 2¾ inches, medium; 2¾ to 3 inches, above medium; 3 to 3½ inches, large; above 3½ inches, very large.

Only 5 per cent of the 60 McIntosh seedlings described are small apples and but 15 per cent below medium, leaving 80 per cent which are of marketable size.

In shape, 60 per cent are roundish or somewhat of the same type as McIntosh, while 31·67 per cent is oblate. This large percentage of oblate apples is interesting as Shiawassee, another seedling of Fameuse, is an oblate variety.

In 73·33 per cent the predominant colour is crimson, while 15 per cent is green. It has been observed that even a larger percentage of green apples occur in the seedlings of Shiawassee and more than 11 per cent in the seedlings of Langford Beauty. These green apples, or apples where green predominates, have in most instances the tender, fine-grained flesh of Fameuse and a suggestion of Fameuse flavour. One of the named Fameuse seedlings which has been on the market for some years, namely, the Louise, has green or yellow predominating and some of the seedlings of McIntosh, Fameuse, and Langford Beauty are very suggestive of Louise. It may be said, however, that the percentage of green apples among the Fameuse seedlings is much less than among the others as out of 33 Fameuse seedlings which had fruited up to this year, none was green and we recollect but one light coloured Fameuse seedling fruiting this year. The appearance of this light-coloured apple in all the seedlings of Fameuse would indicate that somewhere in the ancestry of Fameuse there was a light-coloured apple.

Passing over what may be called the minor characteristics of cavity, stem, basin, and calyx, it is interesting to record that the seeds of 75 per cent of the seedlings are of medium size, as in the case of McIntosh. In the Gano seedlings fully as great a percentage or greater of the seedlings have large seeds, the mother parent, Gano, having large seeds. It is interesting to note that 76·67 per cent of the McIntosh seedlings have indistinct dots, whereas the dots of the McIntosh, though small, are quite distinct.

The skin of McIntosh is tough and 45 per cent of the seedlings have tough skin and 33 per cent have moderately tough skin.

The tender flesh of the McIntosh is found in 95 per cent of the seedlings and this is what helps to make such a large percentage of the seedlings promising apples.

In flavour 66·67 are subacid like the mother parent, 8·33 per cent briskly subacid; 1·67 per cent acid; 1·67 per cent mildly subacid, and 20·00 per cent sweet. The high percentage of sweet apples among the McIntosh seedlings is surprising. Fameuse up to this year had given only 6·06 per cent of sweet apples; Langford Beauty, 3·7 per cent, and Shiawassee 1·78 per cent. The other mother parents which have given a fairly high percentage of sweet apples are Lawver 20·45 per cent, Wealthy 13·44 per cent, Swayzie 10·71 per cent and Gano 10·20 per cent.

The quality of the McIntosh is good and of the seedlings 50·00 per cent are of good quality and 38·33 per cent more are above medium in quality or 88·33 per cent are better than medium.

The Gano apple is medium or worse in qaulity and up to this year of the seedlings of Gano 71·43 per cent were medium or below medium in quality, 28·57 above medium, and none of good quality.

The season of McIntosh is October to February and of the seedlings 68·34 per cent are in season between October and February, though it is too soon yet to compare accurately the keeping quality of the seedlings with the McIntosh. There is 13·33 per cent which are distinctly better keepers than McIntosh, their season being given as December to April. Of apples the season of which is earlier than McIntosh 5 per cent are in season from August to mid-September, and 13·33 per cent from mid-September to October.

McIntosh is evidently a good mother to use where McIntosh characteristics are desired in cross-breeding.

The following names given to seedlings of McIntosh and the fruit of these varieties has been described in previous Experimental Farm reports or in this report:—are Brock, Carno, Caruso, Garnet, Joyce, Lobo, Melba, Nemo, Service, Seton.

PLUMS.

The area in Canada where the European and Japanese plums can be grown is comparatively limited, but there is a very large proportion of the country where the native plums of the *Prunus americana* and *Prunus nigra* groups can be grown

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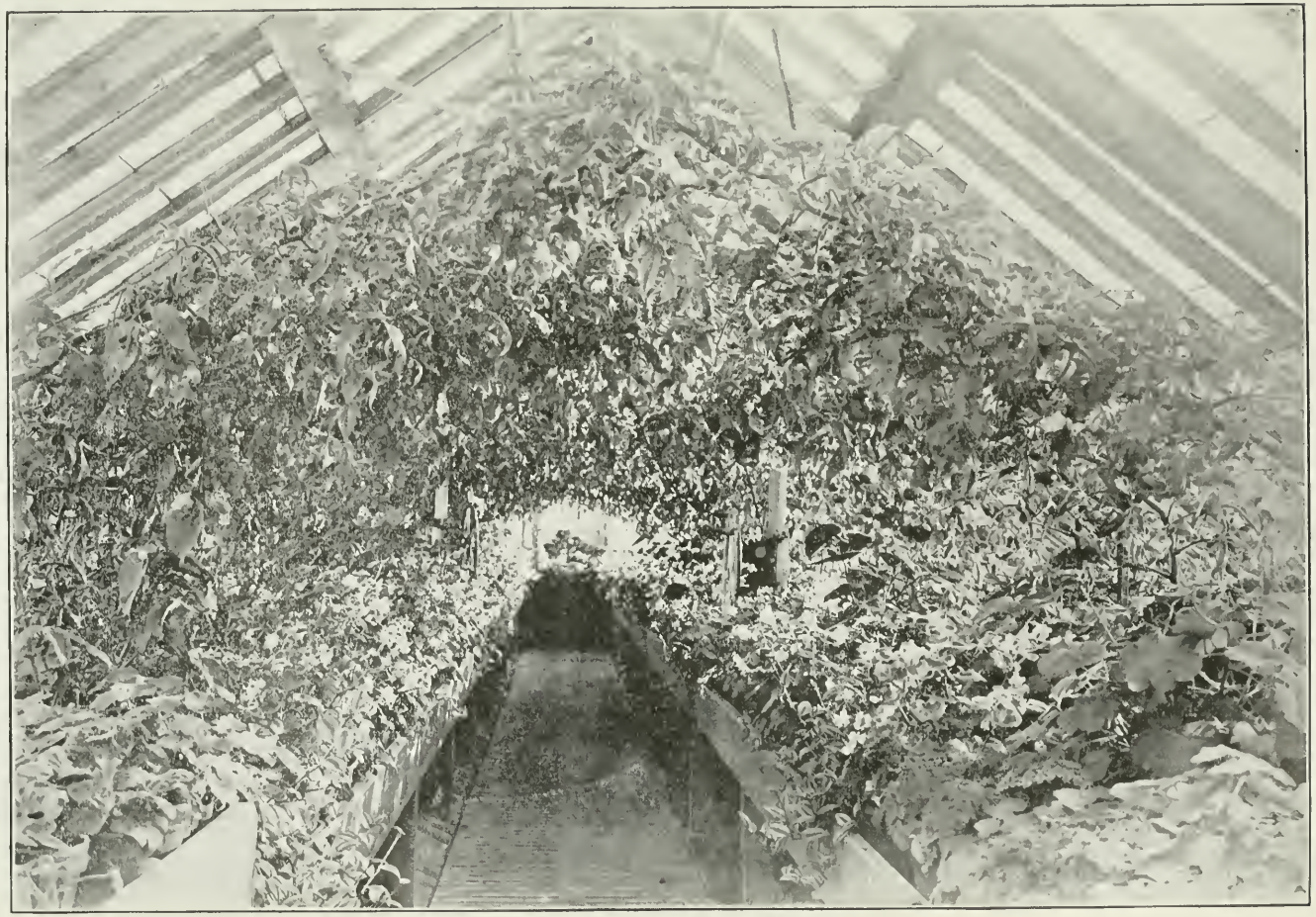


Tomatoes and Flowers in Green House, Central Experimental Farm, Ottawa.

successfully. These plums are natives of the prairies and can be grown successfully very far north, both on the Canadian prairies and in Eastern Canada. It is, however, important to obtain more early varieties as the late ones do not ripen. So far, of the early varieties the Cheney, of the *Prunus nigra* group, is the best on the market. Aitkin and Odegard are also two early ones. Seedlings are being grown at the Central Experimental Farm and at the Branch Farms in the hope of getting more and better early varieties.

Following are descriptions of three plums originated at Ottawa, one of which is early; also descriptions of four hybrid plums originated by Prof. N. E. Hansen, South Dakota Experiment Station, which may prove useful where the European and Japanese varieties do not succeed, as they appear hardier in fruit bud. These are being tested on the Branch Farms on the prairies.

Alma (Caro Seedling).—Oval; large, $1\frac{3}{4}$ x $1\frac{1}{2}$-ins.; cavity narrow, abrupt, medium depth; stem slender, medium length, $\frac{1}{2}$ in.; suture a distinct line, not depressed; apex rounded; yellow, thinly washed nearly all over with bright red; dots few, small, yellow; bloom thin, bluish; skin thick, tough; flesh yellow, juicy; stone above medium size, oval, flattened, cling; flavour sweet, rich, but skin slightly astringent and acid; quality good. Americana group. A handsome plum.

Marler (Caro Seedling).—Roundish to oval; large for Americana, $1\frac{1}{2}$ x $1\frac{1}{2}$ ins.; cavity shallow, medium width; stem medium length, moderately stout; suture a distinct line, not depressed, stem more persistent than with most varieties; apex slightly depressed; yellow, covered with bright crimson; dots numerous, yellow, conspicuous; bloom pinkish; skin thick, but moderately tender; flesh yellow, firm, juicy; stone medium size, oval, cling; flavour sweet, rich, good, acid next skin; quality good; Americana group.

A handsome plum and on account of firmness and good quality should be useful. Hangs on tree well.

Mancheno (Cheney x Manitoba Plum).—Oval; size $1\frac{3}{8}$ x $1\frac{1}{8}$ ins.; cavity narrow, medium depth, abrupt; stem medium length, $\frac{1}{2}$ in., slender; suture indistinct; apex rounded; yellow, almost entirely covered with deep red; dots obscure; skin moderately thick, moderately tough; flesh yellow, juicy; stone large, flat, cling; briskly subacid, somewhat astringent, little flavour; quality medium. Nigra group.

An attractive looking plum and earlier than Cheney. May be useful on this account. Cross by Dr. Wm. Saunders.

Inkpa (Prunus Americana x Chinese Apricot, Hansen).—Globular flattened; size medium, $1\frac{7}{8}$ x $1\frac{1}{4}$ ins.; cavity large, wide, fairly deep; suture distinct, depressed; apex slight, depressed; dark plum colour (*i.e.* dark crimson maroon); dots numerous, very distinct, whitish; bloom slight; skin thick, tough, but not astringent or bitter; flesh buff colour to whitish; stone small, cling; very rich, velvety, pear flavour, sweet and pleasant; quality good.

A very distinctive flavour which might be objected to by some people, otherwise a good plum for both dessert and culinary purposes.

Kaga (Hansen).—Somewhat heart-shaped, about size of Lombard or larger, $1\frac{1}{2}$ x $1\frac{3}{4}$ ins.; cavity deep, abrupt, medium width; suture a distinct line, very slightly depressed; apex rounded; yellow, entirely overspread with deep crimson; dots numerous, yellow, distinct; bloom bluish; skin thick, tough; flesh greenish, yellow, firm; juicy; stone below medium size, roundish, cling; quality above medium to good; sweet, subacid, acid next stone and skin, spicy, pear-like flavour. Hybrid group.

An attractive-looking plum with many Japanese characteristics. It is highly perfumed. Appears hardier in flower bud than most European plums. Should make a good shipping plum.

Sapa (Western Sand Cherry x Sultan, Hansen).—Roundish, somewhat heart-shaped; size 1⅛ x 1 ins.; cavity open, deep, abrupt; stem slender, ¾ in. long; suture a distinct line; apex rounded or very slightly flattened; purple, washed with dark purple; dots numerous, very small, yellow, indistinct; bloom bluish, thin; skin thin, moderately tough; flesh dark purple, very juicy; stone medium size, oval, cling; flavour briskly subacid, sprightly, acid next skin, slightly astringent; quality above medium; Hybrid group.

Tastes a good deal like the better sand cherries, but is larger. Fruit buds evidently hardier than most Japanese varieties.

Tokeya (Sand Cherry x Chinese Apricot, Hansen).—Roundish, almost oblate, flattened at ends; size 1 x 1¼ ins.; cavity deep, medium width; stem moderately stout, ½ in. long; suture an indistinct line, slightly depressed; apex flattened; dark red; dots indistinct; bloom thin, bluish; skin thin, moderately tender; flesh greenish, juicy; stone medium size, roundish, cling; acid, bitter flavour; quality below medium. Hybrid group.

Not at all agreeable to eat on account of bitterness.

TOMATOES.

VARIETY TEST UNDER GLASS IN CONJUNCTION WITH ORNAMENTAL PLANTS.

Some glass became available for the use of the Horticultural Division in 1911, a small greenhouse having been placed at its disposal. This is being used part of the time for the propagation of plants for the ornamental grounds, but some other plants are also being grown. In 1911 it was decided to grow tomatoes in conjunction with begonias, the object being to demonstrate the possibility of a person with a small greenhouse having an attractive greenhouse and at the same time obtaining a crop of vegetables. The tomatoes were planted in a single row 15 inches apart on the benches on each side of the walk, sufficiently far back so that a row of begonias could be grown in front of them. As they grew, the plants were tied to wires and kept to single stems and eventually made an arch over the walk, as shown in the illustration. Twenty-one varieties or strains were grown, four plants of each variety except in the case of two, when only two plants were grown. Half the plants of each variety were on each side of the walk opposite one another.

The seed was sown on June 12, in a cold frame and most of the varieties germinated on the 19. The plants were pricked out in a cold frame on June 29, and planted in the greenhouse on July 19. Laterals were pinched out when necessary, and on August 23, the large leaves were pinched back to let more light between the plants, but this severe pinching is believed to have induced a mosaic appearance on the leaves which, however, did not apparently materially affect the vigour of the plants. However, this treatment is not recommended. The flowers were not artificially pollenized, but occasionally the plants were tapped to scatter the pollen.

Following is a table in which are recorded some of the more important records made in this experiment. It is planned to continue the testing of varieties in this small greenhouse as one year's results are by no means conclusive.

Tomatoes—Test of Varieties under Glass.

Name.	Numbers of plants.	Date of first picking.	Date of last picking.	Numbers of pickings.	Largest yield from single plant at one picking.	Date of largest yield from single plant at one picking.	Total yield of ripe fruit.	Average yield per plant of ripe fruit.	Description of fruit and Remarks.
					Oz.		lbs. oz.	lbs. oz.	
Industry O.A.C. Selected 1910....	4	25-9-11	19-1-12	16	17½	10-10-11	24 11½	6 2¾	Oval, smooth and uniform, flesh firm, juicy, acid, one of the best varieties; fruits above medium size, first class quality and heavy cropper. Scarlet.
Sutton's Satisfaction...	4	28-9-11	19-1-12	15	17	27-10-11	23 12	5 15	Roundish, smooth, uniform in size and colouring, flesh firm and juicy, sweet, one of the best varieties in the house. Scarlet.
Industry O.A.C. Selected 1910-11	4	2-10-11	19-1-12	15	20¼	10-10-11	23 2½	5 12½	Irregular globular, smooth, uniform in size and colour, flesh soft and watery, not much inflavor or quality but heavy cropper and fruit has a very fine appearance. Scarlet.
Livingstone's Globe.....	4	5-10-11	19-1-12	13	18½	10-10-11	21 10¼	5 6½	Globular, smooth slightly corrugated at base, irregular in form, size and ripening; flesh ripens unevenly but of very good quality. This variety is one of the best in all points except that the flesh ripens so very unevenly. Purplish-pink.
Dobbies' Champion	4	28-9-11	19-1-12	15	24	16-10-11	20 6	5 1½	Roundish, slightly corrugated, uniform in size and colour, flesh soft and watery, melting and sweet. One of the very best varieties. Scarlet.
Bonny Best....	4	25-9-11	21-12-12	12	26½	31-10-11	19 14	4 15½	Roundish, flattened, very smooth, uniform in size and colour, flesh soft and watery slightly acid. A very fine variety.
Spark's Earliana C.E. F. $\frac{2}{13}$.	4	22-9-11	21-12-12	12	18¾	27-10-11	13 15	4 11¾	Globular, deeply corrugated, irregular in size, flesh soft and watery ripening irregularly quality poor, flesh soft and watery. The plants being mildewed had no doubt some effect on the quality of the fruit. Scarlet.
Early Wealthy..... ..	4	10-10-11	21-12-11	9	29¾	16-10-11	18 12¼	4 11	Roundish, smooth slightly corrugated, uniform in size and colour, flesh soft and watery ripens unevenly. A good variety retaining uniformity in size and colouring, the only drawback being that the flesh does not ripen evenly. Scarlet.

TOMATOES—TEST OF VARIETIES UNDER GLASS—*Continued.*

Name.	Numbers of plants.	Date of first picking.	Date of last picking.	Number of pickings.	Largest yield from single plant at one picking.	Date of largest yield from single plant at one picking.	Total yield of ripe fruit.		Average yield per plant of ripe fruit.		Description of fruit and remarks.
					Oz.		Lbs.	Oz.	Lbs.	Oz.	
Winter Beauty.....	4	25-9-11	19-1-12	14	12	16-10-11	18	8½	4	10	Roundish, smooth, slightly corrugated, irregular, flesh soft, watery and slightly acid. This variety is of poor quality and the fruit below medium size. Scarlet.
Improved Express (Sherrington)...	4	25-9-11	21-12-11	13	18½	27-10-11	18	5	4	9¼	Roundish, very fine, smooth, uniform in size and colour, flesh firm, juicy and slightly acid, fine large well formed fruits but not many of them. Scarlet.
Clipper O A.C.	4	10-10-11	19-1-12	12	18½	10-10-11	18	4½	4	9¼	Roundish, smooth, uniform in size and colour, of perfect form, flesh firm and solid, melting and juicy slightly acid. Good quality and flavour. A most desirable variety. Scarlet.
Chalk's Early Jewel....	4	25-9-11	19-1-12	11	19½	29-11-11	17	13¼	4	7¼	Roundish, smooth, varying in size very much, flesh firm melting and very sweet, rich and juicy. Taken on the whole this is one of the finest formed and richest flavoured varieties but it is not a heavy cropper. Scarlet.
Cox's Earliest C.E.F.....	4	28-9-11	19-1-12	12	17¾	5-10-11	16	13	4	3¼	Globular, smooth, uniform in size and colour, flesh firm, solid, rich, melting and sweet. A fine variety uniform in all points, a light cropper. Purplish-pink.
Sutton's AI	4	28-9-11	19-1-12	14	14½	10-10-11	15	11½	3	14¾	Globular, slightly corrugated, of fine form but vary in size very much, flesh firm juicy and sweet. A fine variety, flavour and quality good. Scarlet.
Clipper O.A.C. Selected 1910.....	4	28-9-11	19-1-12	13	20	31-10-11	15	8¾	3	14	Roundish, perfectly smooth, uniform in size and colour, fruit firm, watery and slightly acid. A very uniform and fine fruit but a rather light cropper. Scarlet.

Early Dawn	4	22-9-11	21-12-11	15	10	27-10 11	14	12¼	3	11	Roundish, smooth, uniform in size but rather small, flesh soft, rather insipid, very slightly acid. Very small, of no value except for a few early fruits. Scarlet.
Sparks' Earliana Improved Strain No. 10, Johnson	2	5-10-11	21-12-11	10	20¾	10-10-11	10	3	5	1½	Very irregular and angular, deeply corrugated, not at all uniform, flesh soft and watery, slightly acid. Not a desirable variety. Scarlet.
Spark's Earliana C.E.F.	2	28-9-11	21-12-11	10	18¼	7-10-11	8	7¼	4	3½	Globular, slightly corrugated at base, not uniform, fruits varying in size very much, flesh firm and juicy, evenly ripened, fruits a good marketable size and quality, coming in early. Scarlet.
Watt's Wonder	4	25-9-11	19-1-12	11	11	16-10 11	8	1	2	0¼	Roundish, smooth, uniform in size and colour, flesh soft and watery, slightly acid. Only three plants bore fruit and those a very light crop. Scarlet.
Frogmore Selected	4	2-10-11	19-1-12	8	11	10-10-11	7	11¼	1	14¾	Roundish, smooth, uniform in size, some fruits deeply corrugated, others only slightly so, flesh fairly firm, unevenly ripened. A very light cropper and a bad feature of this variety is the fruit ripening so very unevenly. Only three plants of this variety bore any fruit. Scarlet.
Improved Conference	4	2-10-11	19-1-12	8	7¾	31-10-11	5	4¾	1	5	Globular, smooth, uniform in size and colour, flesh rich, juicy and ripened evenly, very good quality what there is of it but the poorest cropper in the house. Only three plants bore any fruit. Scarlet.

ORNAMENTAL GROUNDS.

During the past year, in addition to planting the herbaceous border referred to in another part of this report, in which it is planned to grow the best varieties of herbaceous perennials, the collections of phloxes, iris, paeonies, lilies, gladioli, etc., have been very much improved and increased by the addition of a large number of the newer sorts. A special effort is also being made to get together a representative collection of hybrid tea roses as these roses are becoming extremely popular in Canada and it is important to learn which varieties look and bloom best and which are the hardiest.

HARDY ROSES AND THEIR CULTURE.

There are few persons in Canada who love flowers but who desire to grow roses, but unfortunately there are comparatively few who get beyond the desire, or if they plant some bushes their experiment is often a failure. The rose has the name of being a difficult flower to grow, and this is true as compared with many other ornamental shrubs or herbaceous plants. There are some roses, however, that are very easy to grow and those who are not prepared to give the hybrid perpetual, hybrid tea, and tea roses the attention their beauty merits will find in the Rugosa hybrids, the Austrian briars, Provence or Cabbage, and Damask roses a very good assortment which are hardy and of easy culture, requiring little pruning and not being troubled much with insects or fungous enemies.

The roses usually cultivated in Canada may be divided into four groups so far as hardiness is concerned.

Hardiest Group.—Rosa rugosa and hybrids, Austrian Briars, Provence or Cabbage roses, Damask roses and Moss roses.

Roses of the second degree of hardiness.—Hybrid Perpetuals or Hybrid Remontant, Climbing roses of the Multiflora group, and Dwarf Polyantha roses.

Roses of the third degree of hardiness.—Hybrid Tea roses.

Roses of the fourth degree of hardiness.—Tea roses.

The hardiness of the individual varieties varies considerably within the groups.

Roses of the first group need little or no protection in some parts of Canada. The others must be protected except in very favoured localities.

Site and Soil.—The rose requires an abundance of sunlight for best results and where possible a site should be chosen where the plants will be in sunshine most of the day. If this is not practicable the next best site is one where the bed will get the morning sun but will not be in such a position that the heat of the midday or afternoon sun will be reflected from some wall or building, for in this burning heat both flowers and plants will suffer. South or southeastern exposures are desirable. As roses need an abundance of moisture the bed or garden should not be within reach of the roots of trees which would exhaust the soil of much moisture and plant food as well. On the prairies it is desirable to have the bed where it will not be much exposed to winds and also where the snow will lie well, if possible. This applies, however, to other parts of Canada as well. Just in proportion to the hardiness of roses from the standpoint of winter so is the relative care in the selection of soil for the rose plantation necessary. Roses of the hardiest group will do well on a great variety of soils; roses of the other groups are more fastidious, for while the hybrid perpetuals succeed best in a cool but well-drained clay loam, the tea roses should have a warmer soil, a sandy loam being preferable. However, where it is possible to do so, an intermediate type of soil may be chosen which will suit all the groups. In England, roses succeed much better than in most parts of Canada, the moister air and cooler soil suiting them better than the dry air and hot soil which they are liable to endure in many parts of Canada. A soil, then, should be chosen which is naturally cool, and cool soils are usually those with considerable humus and having a good capacity for

holding moisture. Clay loams are usually naturally richer than sandy loams and as the rose requires a liberal amount of plant food the heavier soils have an advantage in this respect also. Shallow soils should not be chosen for roses as these are liable to become very dry and warm in drought, making conditions unfavourable.

Soils where water lies within three feet of the surface should not be chosen, as such soils are cold and roses will not bloom well in them. Often roses in such soils will make strong growth and will not bloom, puzzling the grower. The soil should be cool, but well-drained, deep and rich, and if it is not this naturally and there is no choice of sites it should be made as nearly like this as possible. Even soils of good quality naturally should be well enriched with well-rotted barnyard manure before the roses are planted, working it well down and through the soil. In order to make a good bed for roses where the soil is not naturally deep and where there is poor drainage, first remove the good soil from the surface, then remove the lower soil so that about two feet in depth of soil is removed altogether. Then if the soil needs drainage, lay three-inch tile on the bottom with sufficient fall to carry the surplus water away having, of course, some outlet for it. If this tile draining is not practicable some gravel or small stones below the two feet of soil will help to drain it. Put good surface soil from somewhere else, preferably with some clay in it, on the bottom, spread a heavy coat of rotted manure on it and dig it in. Then put back the surface soil which has been removed from the bed, or better soil if it is poor, and again dig manure into this. This should make a good bed for roses. The soil should be allowed to settle for a month before the roses are planted, for best results. The kind of preparation of the soil outlined above, while ensuring good results, is not necessary and no person should be deterred from growing roses because of the careful preparation recommended. Roses may be planted in almost any good loamy soil with fair results, provided the soil is neither very wet nor very dry.

Plants and Planting.—Strong, two-year-old budded plants are the best to plant. Yearling plants, while cheaper, do not make much show the first year and one is liable to be discouraged before the next season comes round. Some roses do very well on their own roots, while others are not very vigorous. On the whole, budded plants are the best. The autumn is the best time to plant roses, preferably just before winter sets in. Sometimes, however, roses though ordered for autumn delivery do not reach one in time, in which case a good plan is to heel them in in unfrozen soil by digging away the frozen soil and burying the roots and a large proportion of the stems. The novice in rose culture is, however, more likely to obtain his roses in the spring and it is for this reason that so many failures occur. By the time the plants reach their destination they have often begun to wither and when planted in this condition are almost sure to die. Conditions are made much worse when the plants come in May when the weather may be hot and the winds and soil dry. Tea roses should be planted about fifteen inches apart; hybrid teas about eighteen inches; hybrid perpetuals about three feet, and the Rugosa hybrids, moss roses and other hardy sorts about four feet. If the roses are planted in the autumn they should not be pruned back at that time, but left until spring. If, however, they are planted in the spring it is necessary to prune back severely when planted. The bushes should be planted deep enough so that the point of union between stock and scion is from two or three inches below the surface of the ground. This is important as if the union is at or near the surface, the sun shining on it hardens the wood and prevents a free circulation of sap, which is not desirable, as for best results a strong, vigorous growth is necessary. When planting, the soil should be well tramped about the bush to bring the particles into close contact with the roots and ensure their getting moisture as soon as possible. Roses have comparatively few roots and none of these should be pruned off when planting, unless there should happen to be a very long root preventing proper planting, when its length may be reduced or if there are broken roots they should be removed. The roots should not be exposed to drying

winds when planting any longer than is absolutely necessary. A very good plan, and one we should strongly advise following, is to dip the roots in a puddle made of clay and water. This coating of clay on the roots not only protects the roots when the bushes are being planted, but we believe ensures a quicker flow of moisture to the roots in the soil. If the stems look withered when they are received, the plants should be buried for about two days in wet soil so that the stems may take up water from the soil. This will often save plants which would otherwise die. In addition to this it is desirable if the weather is very dry at planting time, to heap the soil up around the stems until there is rain. When the plants are set in the autumn the soil should be heaped up around the stems to protect them. In the spring this is removed and the plants severely headed back. One should not hesitate to reduce the stems so that there will be only from three to six buds left on each of the stems above the ground. This severe pruning is even more important in the case of spring set plants, and is often the means of saving the plants which would otherwise die.

Cultivation and Watering.—As has been stated before, roses need an abundance of moisture. By keeping the surface soil loose from spring until autumn much moisture which would otherwise pass off into the air will be held in the soil. After each rain the surface should be hoed and raked, or during a dry time, if it has been necessary to water the roses, the soil should be loosened after watering. It is better to water roses thoroughly, occasionally, than to give them a light watering frequently. It is not, however, too often to syringe or spray the foliage with water every day as this is one of the best preventives of insects. The syringing is, however, for the purpose of cleansing the foliage not for adding moisture to the soil. This spraying should be done in the evening or early in the morning as if the foliage is wet in the middle of a hot, dry day it is liable to scald.

Manuring.—Soils should be kept rich and well supplied with humus by the annual application of well-rotted barnyard manure in large quantities. This may be applied on the surface of the ground in the autumn and dug in in the spring or applied in the spring.

Pruning.—The pruning of roses will vary according to the kind and even the variety of rose which is to be pruned. Roses of the hardiest group nearly all bloom on wood of the previous season's growth or wood several years old, and as these roses are grown mainly for the mass effect of their flowers rather than the excellence of the individual flower, they should be pruned so as to produce this mass effect. If, then, they are pruned back to near the ground there will be few roses. If the branches and stems are left their full length or merely headed back a little to make the bush symmetrical there will be a fine mass of roses. In addition to this it is necessary to remove some of the oldest wood each year, cutting the branches out at the ground, thus making room and letting in light so that the younger stems will develop well. As the stems one and two years old are those which give the best flowers there should be a large proportion of these. Dead branches should, of course, be removed.

Most of the roses in the second group must be pruned differently, although the climbing roses may be treated somewhat as has been recommended for the first group, with this exception that, where it is desired to cover a wall with a large rose bush, the old canes must be left to a greater age so as to provide for lateral branches. The Hybrid Perpetual roses give best results so far as quality of bloom is concerned under hard pruning. To obtain the finest flowers one must relentlessly cut back the bushes each spring to within six to twelve inches of the ground. If, however, a mass effect is desired the bushes may be left taller, and where the conditions of soil are exceptionally good, bushes which have not been pruned back severely will give a large number of fine blooms. Experience will soon teach what is the best method

of pruning for particular conditions or desires. The stronger varieties do not require as severe pruning as the less vigorous, and sometimes very few blooms are obtained when a very vigorous variety is cut back to near the ground as the very strong growth which follows is without bloom. It is better to prune early in the spring rather than in the autumn as one never knows how a plant will come through the winter. In pruning, the strongest, healthiest stems are left and the weak ones cut off at the ground. In pruning, leave an outside rather than an inside bud as the top bud, so that the shoot from this bud will grow outward rather than through the plant.

Hybrid Tea roses are pruned much like hybrid perpetuals though usually not so severely. Tea roses, which usually kill to near the ground in Canada, if they live through the winter at all, should have the dead and injured wood removed, and if the wood should not be injured the branches should be pruned back about one-third. It is extremely important to remove suckers or roots springing from the stock on which the rose is budded. These should be removed as soon as noticed and careful watch kept for them. They should be cut off close to the stock and not at or above the ground. It may be necessary to take away a little soil to do this. There is no reliable way of telling the stock, but experience will increase the knowledge in this respect, but vigilance is necessary or the stock will assert itself and soon the rose one thinks he is growing will not be there. The leaves of the stock are often of a paler green colour than the named varieties and not so glossy. Sometimes the leaves of the stock have a purplish tinge. Usually the stocks have a larger number of leaflets on the leaves than the named varieties.

Winter Protection.—Roses of the first group need little or no protection in many parts of Canada. In the Prairie provinces, where the country is open, it is desirable to bend some of them down and cover them with soil and, where evergreen boughs can be obtained, to put some of these over them as well. A little soil taken from one side of the bush will enable one to lay the bush flat down so that the whole of it may be covered. Should the ground freeze and snow fall so that the bush cannot be covered, a good plan is to tie the branches together and then tie over the branches some evergreen boughs, canvas, straw or any material which will protect the bush both from wind and sun. The material should be of such a nature that it will protect the plant but at the same time not hold moisture for any length of time, as if the canes are moist for a considerable time they may mould. For hybrid perpetual, hybrid tea, and tea roses more protection is necessary. One of the simplest methods of protecting both hybrid perpetual and hybrid tea roses is to earth them up six or eight inches or more in the autumn, thus protecting the lower part of the stems, and if the tops are killed back the lower part of the stem is almost sure to remain alive. In addition to this the plant may be bent down and held down with soil or where bushes are not usually pruned back severely they may be entirely covered with soil to preserve them. Where this treatment is not sufficient, a light covering of straw or evergreen boughs over the soil is desirable, which will prevent sudden thawing and freezing and may save the plants sometimes. If the soil is frozen deep before one thinks of covering, the bush may be bent down and held down with boards and covered with evergreen boughs, or even without these the snow may be sufficient protection. In the spring the soil should be levelled and the bushes raised as soon as possible to prevent the development of disease. Good results are obtained where the preceding method fails by bending the bushes down and covering them with a box, and still further protection is afforded by bending down, putting a box without cover or bottom over, then filling this with dry leaves and putting a cover on the box, which should be tight. If the leaves are wet when put in or if they become wet in the spring the stems may mould. When boxes are used the cover should be raised at the first opportunity in the spring to allow a freer circulation of air and permit the stems to dry and the bark harden a little before removing the box altogether.

Climbing roses may be taken down, the branches tied together and put in a long, narrow box and treated as described, if it is found necessary. Tea roses are the most tender and they should be earthed up as described for hybrid perpetuals and hybrid teas, and in addition, for best results, covered with a box filled with dry leaves as described. The degree of protection will depend on what part of Canada the grower lives in, but at least one of the methods described should be suitable for most conditions.

Insects and Fungous Enemies and How to Treat them.—Good foliage is essential to the production of good roses, and, moreover, good foliage is desirable in a rose garden because of its appearance. Leaves badly curled, mildewed, spotted or eaten take away very much from the attractive appearance of a rose garden. The easiest insect to control is the Rose Slug, a green caterpillar which does not usually appear in great numbers but which works on the underside of the leaves and eats out pieces. These may be picked off by hand where bushes are few, but Paris green or hellebore sprayed on the bush so that it will reach the undersides of the leaves especially will quickly kill them. If Paris green is used it should be used weak so as not to burn the foliage, or about in the proportion of 1 ounce to 12 gallons of water. Hellebore is used in the proportion of 1 ounce to 2 gallons of water.

The Aphis or green fly is sometimes quite troublesome, and the thrips, small, hopping insects which cause the leaves to curl, often do much harm unless controlled. There are several good remedies for these, and, as prevention is better than cure, a remedy should be applied before the insects have increased in numbers. As stated before, thorough spraying with water is a good preventive. First, nicotine in the proportion of one teaspoonful to one gallon of water or a decoction made of quassia chips and soft soap or whale oil soap made by boiling four ounces of quassia chips for ten minutes in a gallon of soft water, then strain and while the liquid is still warm dissolve four ounces of soft soap or whale oil soap in it and before using add one gallon of water. It may be necessary to syringe with water after the insects are killed to clean the plants.

Whale oil soap in the proportion of 1 lb. to 6 gallons of water is a good insecticide to use for aphis or thrips and kerosene emulsion is a reliable remedy, but if improperly made the foliage may be injured.

The same remedies may be used for Red Spiders, tiny insects, the presence of which is indicated by a yellowing of the leaves. These insects work on the underside of the leaves and unless the eyesight is good cannot be detected with the naked eye. Thorough and frequent syringing of the underside of the leaves with water alone will help to keep these insects under control, and flowers of sulphur mixed with kerosene emulsion or whale oil soap will make these insecticides more effective.

Where the Powdery Mildew is troublesome it may be controlled by sprinkling the bushes every ten or twelve days with flowers of sulphur until the disease disappears. The Leaf Blotch or Black Spot is another disease which sometimes disfigures the leaves very much and weakens the plant. Bordeaux mixture and Ammoniacal Copper Carbonate Solution will control this, but if the former is used it should be used several weeks before the blooming season or after it, so that the foliage will not be disfigured by the spraying material when the roses are in bloom. When the disease is in a plantation, every effort should be made by thorough spraying to control and destroy it as soon as possible.

Best Varieties of Roses.

MISCELLANEOUS HARDIEST VARIETIES.

Rugosa Hybrids.—Mad. Georges Bruant (white, double), Blanc Double de Coubert (white, double), Conrad F. Meyer (clear, silvery rose, double), Madame Charles

Worth (rosy-carmine, semi-double), Agnes Emily Carman (crimson-red, semi-double), Mary Arnott (carmine-red, semi-double).

Austrian Briar.—Persian Yellow (yellow, double).

Damask.—Madame Hardy (white, double).

Hybrid Perpetual.—Madame Plantier (white, double).

Moss.—Old English Pink, Crested, and Blanche Moreau.

Hybrid Perpetual—Hardiest and Best Ten.—Frau Karl Druschki, Magna Charta, General Jacqueminot, Mrs. John Laing, Ulrich Brunner, Baronne de Bonstetten, Mrs. R. G. Sharman-Crawford, Madame Plantier, Madame Joly, John Hopper, Prince Camille de Rohan, and Pierre Notting. (For description, see other lists.)

Best Ten:—

Frau Karl Druschki (the best white rose).
Ulrich Brunner (cherry-crimson; of good form; very fragrant).
General Jacqueminot (crimson-scarlet; a popular rose; fragrant).
Mrs. John Laing (soft pink, and of good form; a free bloomer; fragrant).
Magna Charta (bright rose; one of the most reliable).
Charles Lefebvre (velvety crimson; good form; fragrant).
Capt. Hayward (scarlet-crimson; good form, fragrant).
Margaret Dickson (white with pale flesh centre; fragrant).
Mrs. R. G. Sharman-Crawford (deep, rosy-pink; outer petals shaded with pale flesh.
Clio (flesh colour, shaded with rosy-pink).

Second Best Ten

Earl of Dufferin (rich velvety crimson, shaded maroon; fragrant).
Baronne de Bonstetten (velvety blackish-crimson).
Countess of Rosebery (deep rose; fragrant).
Duke of Edinburgh (very bright vermilion; fragrant).
Baroness Rothschild (pale rose; slightly fragrant),
Her Majesty (clear, satin-rose).
Hugh Dickson (brilliant crimson, shaded scarlet; fragrant).
Fisher Holmes (deep crimson; fragrant).
Etienne Levet (carmine-red; fragrant).
Madame Gabriel Luizet (light, silvery-pink; very slightly fragrant).
Anna die Diesbach (attractive carmine; fragrant).
Helen Stewart (bright crimson, approaching scarlet; fragrant).
Prince Camille de Rohan (deep, velvety-crimson).
Alfred Colomb (deep, reddish-pink; fragrant).

List of the Twelve Best Hybrid Tea Roses.

1. Caroline Testout—Satin rose with brighter centre; fragrant.
2. Dean Hole—Silvery carmine shaded salmon; fragrant.
3. Etoile de France—Velvety crimson, red centre; fine form.
4. Gruss an Teplitz—Very bright scarlet crimson; free bloomer; semi-climber; fragrant.
5. J. B. Clark—Deep scarlet shaded with blackish crimson; fragrant.
6. Kaiserin Augusta Victoria.—Cream slightly shaded lemon; fragrant fine form.
7. Killarney—Flesh shaded white suffused with pale pink; fragrant; fine form.

8. La France—Bright pink; very fragrant.
9. Madame Abel Chatenay—Carmine rose shaded salmon; very free flowering; fine form.
10. Madame Ravary—Golden yellow; very free flowering.
11. Mrs. Aaron Ward—Yellow washed with salmon rose; a beautiful rose.
12. Theresa—Deep orange apricot tinged carmine; fragrant.

Other popular varieties are Betty, Mildred Grand and Viscountess Folkestone.

Some Hybrid Tea Roses, which give promise of great excellence, selected from varieties planted in 1911, at the Central Experimental Farm.

Red and shades of red:—

1. Laurent Carle—Velvety crimson.
2. Rhea Reid—Cherry red and crimson.

Pinks and shades of pink:—

3. Colonel R. S. Williamson—Light pink almost white.
4. H. Armitage Moore—Rose and silvery pink.
5. Yvonne Vacherot—Pink and coral white.

Flesh and shades of salmon:—

6. Antoine Rivoire—Rosy flesh tinged yellow.
7. Dorothy Page Roberts—Pink and salmon.
8. Dornroschen—Flesh coloured.
9. Grace Molyneux—Apricot and flesh colour.
10. Margaret Molyneux—Saffron yellow and apricot
11. Lady Helen Vincent—Salmon and pink.
12. Mrs. William Cooper—Rosy flesh.
13. Queen of Spain—Pale flesh.
14. Souvr. du Président Carnot—Flesh and white.

Yellows:—

15. James Coey—Yellow to white.
16. Le Progrès—Golden yellow.

Whites and cream shades:—

17. Emiliano Oliden—White, tinted carmine.
18. Marie Mascauraud—White, slightly salmon.

Six of the best and most popular Tea Roses.

1. White Maman Cochet—White, tinged lemon.
2. Maman Cochet—Deep flesh, suffused light rose.
3. Madame Jules Gravereaux—Flesh, shaded yellow.
4. The Bride—White, tinged lemon.
5. Bridesmaid—Bright pink.
6. Souvenir de Pierre Notting—Apricot yellow, shaded orange.

Hardiest and Best Climbing Roses—

Crimson Rambler (crimson, double).
Dorothy Perkins (soft, light pink).

Tausendschon (pink, rosy-carmine when opened; not thoroughly tested; promising).

Gloire de Dijon and Marechal Niel, climbing roses, are grown with success in the southern part of Vancouver Island.

DWARF ROSE.

Madame N. Levavasseur (Baby Rambler) (rosy-crimson; good for massing in beds).

The Prairie Climbing roses are not satisfactory in Canada except in the most favoured locations. The Penzance Sweet Briars are also only adapted to the warmest parts. Of these the Lady Penzance, a very striking single rose of a coppery colour, appears to be the hardiest. The Wichuriana hybrids are not hardy enough in Canada except in the warmest parts of the Dominion.

HYBRID ROSES TESTED AT OTTAWA.

There has been a rose garden at the Central Experimental Farm since 1891, and during the past twenty-one years a large number of varieties has been tested. Before removing the old plantation in the autumn of 1911, notes were taken on the varieties which had proved hardiest, and in the following table these and other notes are given. To define the degree and quality of perfume which these roses have, the x mark has been used, three x's being the highest degree of perfume, and one x the lowest where there was any perfume. The rank indicates the relative general quality of the variety.

Hardiest Roses at Ottawa.

Name.	Planted.	Rank.	Colour.	Degree of Fragrance.	Remarks.
Hybrid Perpetual Roses.					
A. Red and shades of Red—					
1 Abel Carriere	1899	Between 1st and 2nd.	Purple-crimson	xx	
*2 Bessie Johnson	1896	Second	Red fading to mauve.	xx	
3 Baronne de Bonstetten	1894	First	Blackish-crimson	xxx	Bush of vigorous habit.
4 General Jacqueminot	1897	Between 1st and 2nd.	Crimson-scarlet	xx	Bush moderately vigorous
5 Pierre Notting	1901	Between 1st and 2nd.	Deep-crimson	xx	A late rose.
6 Prince Camille de Rohan	1897	Second	Velvety-crimson	xx	
*7 Souvenir de Duchess	1896	"	Blackish-crimson	x	Moderately vigorous.
8 Thomas Mills	1894	"	Crimson	xx	
B. Pink and shades of Pink—					
*9 Baronne Prevost	1895	"	Deep rose-pink	xx	Bush, vigorous.
*10 Comtesse Cecile de Chabrillant.	1894	"	Deep pink	xx	
11 Comtesse d'Oxford	1894	"	Reddish-pink	xxx	
12 Caroline de Sansal	1894	"	Rose-pink	xx	
*13 Catherine Soupert	1899	First	Shell pink	xx	
*14 Louise Odier	1895	"	Good pink	x	Very free bloomer.
15 La Reine	1901	Second	Carmine pink	xx	Very open type.
*16 Madame Gomet	1896	"	Bright pink	xx	Very free bloomer.
*17 Madame Joly	1894	First	Medium pink	xx	Bush, vigorous; long season; flowers of good form.
18 Magna Charta	1897	"	Deep pink	x	Free bloomer.
19 Madame Gabriel Luizet	1894	"	Coral rose	x	Long season.
20 Oakmont	1894	Second	Pink colour	x	Good bloomer.
21 Victor Verdier	1894	Between 1st and 2nd.	Carmine rose	xx	
22 Madame Plantier (white)	1897	First	Pure white	xx	Vigorous; free bloomer; one of the best white roses.
Miscellaneous Roses.					
Moss Roses—					
23 Blanche Moreau	1894	First	White	xx	Free bloomer; very vigorous.
24 Perpetual White Moss	1896	Second	"	xx	
25 Centifolia	1894	Between 1st and 2nd.	"	xx	Free bloomer; vigorous.
26 Glory of Mosses	1896	First	Red to mauve	xx	Free bloomer.
27 Other Named Moss Roses	1894	Second	Shades of pink and red.	xx	All vigorous.
Rugosa Roses—					
28 White and Red Rugosa	1897 and later.	First	White and shades of pink and mauve		Both single and double form.
Damask Rose—					
29 Madame Hardy (white)	1894	Second	White fading pinkish.	x	Vigorous.
Rugosa Hybrids—					
30 Madame Geo. Bruant	1894	First	White	xx	Vigorous.
31 Madame Chas. Worth	about 1897	"	Rosy carmine	x	Vigorous.
32 Agnes Emily Carman	1894	"	Crimson red	x	Very free bloomer.
33 Mary Arnott	about 1897.	"	Carmine red	x	Specially free bloomer; flowers in fine clusters.

HARDIEST ROSES AT OTTAWA—SECOND LIST.

The asterisk indicates that these roses are now no longer obtainable at most nurseries. In many cases their places have been taken by roses of better colour or better form. The Hybrid Tea roses, which in most cases are of superior colour, form, and length of blooming season, are also fast taking the place of many of these older Hybrid Perpetual Roses. Several hundred of these latter are now under test at the Central Farm.

The second list of Hybrid Perpetuals which follows here contains those roses which have been growing at the Farm for periods varying from five to ten years and have up to the present shown satisfactory indications of hardiness and vigour which are the two points of merit in which those in the first list showed the greatest superiority. Full details are not given as many of them are still under test.

HYBRID PERPETUAL ROSES (2).

Red and Shades of Red—

34. Anna die Diesbach, carmine.
35. Duke of Connaught, velvety crimson.
*36. Empress of India, light crimson.
37. Horace Vernet, velvety red.
*38. King of Sweden, dark crimson.
39. Lady Helen Stewart, dark crimson.
40. Madame Victor Verdier, cherry red.
41. Marie Rady, brilliant red.
42. Reynolds Hole, rich maroon.
43. Ulrich Brunner, cherry crimson.

Pink and Shades of Pink—

*44. Clara Cochet, deep pink to red.
45. Duchess de Morny, bright rose.
46. John Hopper, rose pink.
47. Merveille de Lyon, light pink white centre.
48. Mrs. John Laing, clear pink.
49. Mrs. R. G. Sharman-Crawford, rose pink.
50. Paul Neyron, deep rose.

MISCELLANEOUS ROSES.

51. Sir Thomas Lipton, white Rugosa hybrid.
52. New Century, pink Rugosa hybrid.
53. Universal Favourite, rose climber (Wichuriana hybrid).
54. Lady Gay, pink climber.
55. Crimson Rambler, crimson climber.
56. Dorothy Perkins, bright pink climber.
57. Persian Yellow, yellow rose.
58. Harrison's Yellow, deep yellow.

REPORT OF THE DOMINION CEREALIST

CHARLES E. SAUNDERS, B.A., PH.D.

OTTAWA, March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director of Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith the ninth Annual Report of the Cereal Division, in which a brief synopsis is given of some of the principal investigations carried on between April 1, 1911 and March 31, 1912.

The season of 1911 was unfavourable for cereals in many districts, and the results of the year are therefore not so satisfactory as might have been expected. The excessive heat at Ottawa did considerable damage to nearly all crops, especially to peas and flax, the latter being indeed almost a total failure.

At several of the branch Farms and Stations the crops were not so good as usual. In the Prairie Provinces considerable damage was done by rain, frost and hail.

In some respects, however, the unusual conditions served a good purpose, since they brought out clearly the superiority of some of the new varieties of grain which have been produced on the experimental farms.

The erection of a suitable building for the use of the Cereal Division at Ottawa has made it possible to carry on the work in a much more efficient and satisfactory manner. The full advantage of the new accommodations could not, however, be obtained this year as some of the important details in the internal structure are not yet finished.

My thanks are due to my Assistant, Mr. H. Sirett, B.S.A., for the valuable help he has given to me in many directions, to the foreman in charge of the field work at Ottawa and of the distribution of seed grain, Mr. Geo. J. Fixter, for the accuracy and care with which he has performed his work, to Mr. Wm. Ellis for his careful reports on the germination tests of grain, and to my stenographer, Miss Gertrude Ker, for the willing manner in which she has discharged her duties, especially when dealing with the very heavy correspondence of the winter months.

The other members of the permanent staff of the Division I wish also to thank for the interest they have displayed in performing the work which has been assigned to them.

I have the honour to be, sir,
Your obedient servant,

CHARLES E. SAUNDERS,
Dominion Cerealist.

JOURNEYS.

In the months of June and July I visited the branch Farms and Stations in the Provinces of Manitoba, Saskatchewan and Alberta. At that period most of the crops were in excellent condition.

On July 28, I sailed for England for the purpose of seeing some of the experiment stations in that country and on the continent and also in order to be present at the Fourth International Conference on Genetics in Paris in the month of September.

The principal experimental stations, laboratories, and trial grounds visited were those at Rothamsted, Reading, Woburn, Cambridge, Warrington (Garton Bros.) and Raynes' Park (Carter's) in England, Svalöf in Sweden, Verrières (Vilmorin-Andrieux et Cie.) near Paris, and the Swiss Botanical Station at Lausanne. At all of these stations I was treated with great kindness and was given an opportunity of studying the methods of work and the results of the experiments which are being carried on.

MEETINGS.

The Conference on Genetics at Paris, France, was a notable gathering which included most of the leading men engaged in the study of heredity in plants and animals. The Conference lasted from September 18 to 23, and the programme embraced five sessions, of about three hours each, for business, and five excursions and visits to important institutions. I presented (in French) a paper dealing with some of the work of the Cereal Division under the title 'Breeding Varieties of Wheat of High Baking Strength.' In addition to the business sessions, receptions and other social gatherings were held, so that the members of the Conference had ample opportunity to become acquainted with one another.

The utmost kindness and hospitality were shown to every one present, especially to the members from foreign countries.

Other important meetings which I attended during the past twelve months were as follows:—Convention of Operative Millers and Exposition of Milling Machinery at Detroit, Mich., in June; Annual Meeting of the American Association of Milling and Baking Technology at Washington, D.C., in November; Annual Meeting of the Canadian Seed Growers' Association at Ottawa in February and the Convention of Manitoba Agricultural Associations at Winnipeg in February. At the Seed Growers' meeting I gave an address on 'The Distribution of Seed Produced at Experimental Farms,' and at the Manitoba Convention I delivered two addresses, one on 'The History of Marquis Wheat' and the other on 'Cereal Breeding.'

DISTRIBUTION OF SAMPLES OF SEED GRAIN AND POTATOES.

Some changes in the regulations and methods of the annual seed distribution have been found necessary, with a view to placing the seed as far as possible in the hands of those farmers who are likely to make the best use of it.

As great difficulty was experienced in finding potatoes suitable for distribution, not many of the applicants could be supplied this year. The number mentioned in the table includes only the samples sent out to Ontario and Quebec. The other provinces were supplied from the branch Experimental Farms.

Though the distribution is not quite finished at the time of writing this report the figures will be revised before the report is printed so as to include the whole of the distribution, which usually closes early in May.

The seed grain distributed this winter was grown at Indian Head, Sask., Brandon, Man., and Ottawa, Ont.

Owing to the scarcity of good material for distribution (especially potatoes and oats) and owing also to the enforcement of some necessary regulations to prevent waste of seed, the number of samples distributed is considerably less than last year.

Steps are being taken to ensure a larger supply of good seed for next year.

The following tables show the number of samples distributed:—

DISTRIBUTION—Classified by Varieties.

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
Oats—		Spring Wheat—	
Banner	1,374	Marquis	5,343
Improved Ligowo	145	Stanley	886
Thousand Dollar	98	Red Fife	327
Daubeney	42	Preston	280
		Huron	221
Total	1,659	White Fife	121
		Early Red Fife	19
		Bobs	6
Barley (six-row)—		Total	7,203
Manchurian	1,899		
Odessa	3	Peas—	
		Golden Vine	761
Barley (two-row)—		Arthur	562
Hannchen	42		
Canadian Thorpe	36	Total	1,323
Invincible	23		
		Potatoes—	
Total	2,003	Wee Macgregor	1,285

DISTRIBUTION—Classified by Provinces.

—	Prince Edward Island.	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	Saskatchewan.	Alberta.	British Columbia.	Total.
Oats	31	145	75	577	333	62	248	162	26	1,659
Barley	19	66	41	612	350	115	437	343	20	2,003
Wheat	36	173	119	1,058	275	655	2,976	1,877	34	7,203
Peas	7	98	72	666	156	37	167	91	29	1,323
Potatoes	.....	.....	.....	736	549	.....	.....	.....	.....	1,285
Total	93	482	307	3,649	1,663	869	3,828	2,473	109	13,473

TESTS OF THE VITALITY OF SEED GRAIN GROWN IN 1911 AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA, AND AT THE BRANCH EXPERIMENTAL FARMS.

The following table, prepared by Mr. Wm. T. Ellis, gives the results of the germination tests of the seed grain produced at the various Experimental Farms in 1911:—

CENTRAL EXPERIMENTAL FARM, OTTAWA.

Kind of Seed.	Number of Tests.	Highest Per Cent.	Lowest Per Cent.	Average Per Cent. of Strong Growth.	Average Per Cent. of Weak Growth.	Average Total Vitality.
Wheat	177	100·0	50·0	82·1	4·8	87·0
Barley	114	100·0	53·0	81·6	7·0	88·6
Oats	65	100·0	69·0	91·8	2·4	94·2
Peas	42	100·0	66·0	....	...	89·0

CHARLOTTETOWN, PRINCE EDWARD ISLAND.

Wheat	21	98·0	71·0	88·0	2·3	90·3
Barley	26	100·0	91·0	95·2	2·2	97·5
Oats	34	100·0	87·0	94·6	2·0	96·6
Peas	13	100·0	52·0	....	...	86·7

NAPPAN, NOVA SCOTIA.

Wheat	11	92·0	51·0	77·6	3·4	81·0
Barley	17	92·0	88·0	91·8	2·3	94·1
Oats	15	98·0	85·0	84·9	4·7	89·6
Peas	12	92·0	66·0	....	...	77·1

CAP ROUGE, QUEBEC.

Wheat	11	99·0	84·0	89·5	4·0	93·6
Barley	13	99·0	68·0	82·9	9·9	92·8
Oats	12	100·0	93·0	96·6	1·2	97·9
Peas	10	100·0	74·0	....	...	93·2

BRANDON, MANITOBA.

Wheat	33	100·0	79·0	89·6	2·0	91·7
Barley	23	99·0	61·0	86·9	1·8	88·8
Oats	24	99·0	78·0	89·7	3·2	92·9
Peas	13	98·0	70·0	....	...	83·0

INDIAN HEAD, SASKATCHEWAN.

Wheat	54	98·0	65·0	86·8	2·6	89·4
Barley	36	100·0	72·0	92·3	1·7	94·0
Oats	31	100·0	14·0	77·7	5·7	83·4
Peas	16	96·0	62·0	....	...	82·5

ROSTHERN, SASKATCHEWAN.

Wheat	31	91·0	5·0	62·2	7·8	70·0
Barley	17	98·0	59 0	86·7	2·7	89·4
Oats	23	92·0	20·0	42·7	3·9	46·6
Peas	10	54·0	8·0	....	...	20·6

LACOMBE, ALBERTA.

Wheat	35	96·0	45·0	62·7	5·5	68·2
Barley	34	91·0	43·0	66·2	8·2	74·4
Oats	32	85·0	34·0	56·2	6·7	63·0

(Signed) WILLIAM T. ELLIS.

MILLING AND BAKING TESTS.

These tests were confined almost exclusively this year to a study of a few of the most promising new cross-bred varieties of spring wheat which had not been previously tried for bread-making. Three or four of these new sorts gave flour in the highest class both for colour and strength.

Test of some of the early-maturing, cross-bred varieties grown at Indian Head last season were also made, with very satisfactory results so far as the relative standing of the new wheats compared with Red Fife is concerned.

It is proposed to publish the details of these tests at some later date.

SELECTION OF CEREALS.

The work of eliminating the less desirable varieties from among the large number of cross-bred sorts which are being grown at Ottawa is progressing as rapidly as circumstances permit. Great care has to be taken to guard against the rejection of any variety of special value. Those sorts which are of the highest promise are tested at one or more of the branch Farms as soon as a sufficient quantity of seed is available.

Last season eight new early-maturing varieties of spring wheat were sent to the Experimental Farms at Brandon and Indian Head in order to ascertain their fitness for cultivation in the provinces of Manitoba and Saskatchewan. The unfavourable season proved a severe test and showed that some of them are scarcely likely to be of use in those provinces. Three varieties, however, succeeded very well. One of these proved so successful that it has been named ('Prelude') and arrangements are being made to grow it for distribution next season.

PRELUDE WHEAT

Although Marquis wheat leaves little to be desired as a main crop variety for many sections in Central Canada, it is not early enough to fill the wants of all districts. The Dominion Cerealist intends, therefore, to introduce at least two new sorts, one ripening about a week earlier than Marquis (under average Saskatchewan conditions) and the other ripening about two weeks earlier than Marquis. There are ten or twenty very promising new cross-bred sorts now being studied with a view to selecting the best from among them to furnish the variety ripening one week ahead of Marquis. In the earliest group of all, the number of good varieties is much smaller. The best sort among those which have been sufficiently studied is now

being propagated for distribution. This new wheat has been named 'Prelude' since it ripens at the very beginning of the wheat harvest. Its previous designation was 135 B. Its descent may be traced as follows:

In the year 1888 a systematic and extensive series of experiments in the cross-breeding of wheats for the production of new varieties especially adapted to Canadian conditions was inaugurated by the Director of the Experimental Farms, Dr. Wm. Saunders. Some of the work in the fields was done by himself and some of it by his assistants. One of the crosses made by Dr. A. P. Saunders at that time was between Ladoga wheat and White Fife. From this cross arose the variety Alpha. In the year 1892 Alpha was crossed by Dr. A. P. Saunders with one of the wheats present in the commercial mixture known as Hard Red Calcutta. From this cross a variety was derived to which the name of Fraser was given. In 1903 the Dominion Cerealist crossed a very early ripening wheat from India (obtained under the name of Gehun) with Fraser. Prelude is one of the selections made from the progeny of this cross.

Prelude is an extremely early-ripening wheat producing short straw which stands up well. The heads are bearded, the awns being frequently of a dark colour. The chaff is yellowish and downy. The kernels are red, rather exceptionally hard, and of remarkable plumpness and high weight per bushel. The flour produced from this wheat is of the popular, granular type and of very high baking strength. In two series of baking trials, Prelude has surpassed Red Fife in strength, and in one season (see Report for 1910, page 168) it stood at the head of the list of all varieties tested. The colour of the flour is slightly darker than Red Fife or Marquis. Prelude has been grown for several years at Ottawa and for one season at Brandon and Indian Head. It gives a good yield but must not be expected to compete in this regard with Marquis or Red Fife under conditions which are favourable to these later sorts. It will certainly outyield the later varieties in localities which are subject to destructive early frosts.

During the two years in which Prelude has been grown in the regular test plots at Ottawa it has ripened in 92 and 82 days and has given crops at the rate of 2,010 and 1,740 lbs. per acre, an average of 1,875 lbs. or 31¼ bushels per acre. Last season at Brandon it matured in 94 days from seeding, and was cut on July 31. It gave a crop at the rate of 29 bushels 10 lbs. per acre. At Indian Head, last season, it required 113 days to mature, while Marquis required 131 and Red Fife 138 days. Prelude at Indian Head was cut on August 10, and gave a crop at the rate of 38 bushels 40 lbs per acre.

It is expected that a limited distribution of Prelude wheat will be possible next winter. It will be sent to those localities for which a very early-maturing variety is required. Farmers in districts for which Marquis or Red Fife is suitable must not expect to receive this new variety until the needs of less favoured localities have been met.

MARQUIS WHEAT.

A few details in regard to the origin and characteristics of Marquis wheat were given in the report of the Experimental Farms for the year 1906. It seems necessary, now, to treat this subject at somewhat greater length in view of the exceptional interest which has lately been aroused in this wheat.

Among the crosses made by the Director of Experimental Farms and his assistants during the first few years after the Farms were established, several were effected between Red Fife and various early-maturing wheats from Europe and Asia. All the details in regard to the origin of Marquis are not available, but it is one of the descendants of a cross between an early-ripening Indian wheat, Hard Red Calcutta (as female) and Red Fife (as male). The cross (as appears from unpublished notes) was made by Dr. A. P. Saunders, probably at the Experimental Farm at Agassiz, in the year 1892. The cross-bred seeds, or their progeny, were transferred to Ottawa and

writer of this report was appointed in 1903 to take charge of the work of cereal breeding, he made a series of selections from the progeny of all the cross-bred wheats which had been produced at Ottawa up to that time. Some of these had been named and others were under numbers. Though they had all been subjected to a certain amount of selection, each of them consisted of a mixture of related types. In some cases all the types present were similar. In other instances striking differences were observed. The grain which had descended from the cross referred to above was found by careful study of individual plants (especially by applying the chewing test to ascertain the gluten strength and probable bread-making value) to be a mixture of similar-looking varieties which differed radically in regard to gluten quality. One of the varieties isolated from this mixture was subsequently named Marquis. Its high bread-making strength and colour of flour were demonstrated in the tests made at Ottawa in the early months of 1907, and all the surplus seed was at once sent to the Indian Head Experimental Farm for propagation.

It will be clearly seen from the above account that the question, 'When was Marquis wheat originated?' can never be answered. It came into existence probably at Ottawa between the years 1895 and 1902. It remained, however, mixed with other related sorts until discovered by the writer in 1903. It was first grown in a pure state in 1904, when a few seeds were sown in a sheltered garden on the Central Experimental Farm. Even then, however, its fine qualities were only partly known, and it was not until the cerealist's baking tests of 1907 were completed that he decided to send out this wheat for trial in Saskatchewan. Its success in the prairie country was phenomenal. The year 1907 was quite unfavourable for most varieties owing to the prevalence of rust and of cool, wet weather. The early-ripening habit of Marquis and its power of resisting rust (to a certain extent) gave it an immense advantage. The result was that it headed the list of varieties in plots and fields alike. It yielded at the rate of 32 bushels per acre in the plots while Red Fife gave 12 bushels. In the fields it yielded at the rate of 42 bushels per acre and stood far ahead of any other sort.

Taking the average of the past five years (1907-1911 inclusive) Marquis has given 50 per cent more crop than Red Fife, on the uniform trial plots at Indian Head.

At Brandon in a test for four years (1908-1911 inclusive) Marquis has yielded 10 per cent more than Red Fife.

In addition to its productiveness, the chief points in favour of Marquis, for the provinces of Saskatchewan, Manitoba and Alberta, are its earliness in ripening (generally from 6 to 10 days earlier than Red Fife), strength of straw and comparative freedom from rust, heavy weight per bushel and fine appearance of the grain, and the excellent colour and baking strength of the flour produced from it.

The best field crops of Marquis wheat have exceeded the plot records at both Brandon and Indian Head. In 1909 a field of 4½ acres at Brandon gave 52¼ bushels per acre. In 1910 a field of 5½ acres at Indian Head gave a little over 53 bushels per acre.

But the previous records were surpassed at Rosthern last season when a ⅒-acre plot of Marquis wheat at the Experimental Station yielded at the rate of 70 bushels per acre, and when Mr. Seager Wheeler obtained (from 5 lbs. of seed produced at Ottawa the previous year), 250 lbs. of wheat and two sheaves not threshed but estimated to contain at least 5 lbs. of grain each. This extraordinary yield was obtained on a strip of land measuring 15 x 155 ft. equal to about 1/19 of an acre. This constitutes probably a world's record for spring wheat. The crop from this plot furnished part of the seed with which Mr. Wheeler gained the highest award for spring wheat at the New York Land Show last autumn.

Marquis wheat is recommended as the best variety of wheat now available for Saskatchewan, for many parts of Alberta and for Manitoba, except in the southern portion where the superiority of Marquis over Red Fife has not yet been demonstrated.

For the eastern provinces and for British Columbia, Marquis has not proved specially productive or valuable.

In the report of last year, Early Red Fife was mentioned as a variety much like Marquis in most respects and a rival to the latter sort. It was stated, however, that Early Red Fife appears to be more subject to rust than Marquis. Further experience under the unfavourable conditions of last season proves this to be correct. Early Red Fife is, therefore, not recommended for general use throughout the prairie provinces. It has done well, however, in some of the drier districts where rust is less prevalent. In the eastern provinces, Early Red Fife has a record as good as, or better than, Marquis.

EXPERIMENTS WITH CEREALS, ETC., ON THE CENTRAL EXPERIMENTAL FARM, OTTAWA.

The remainder of this report gives the results of the field work at Ottawa in the season of 1911, and the conclusions drawn from several years' trials as to the best varieties for cultivation in those parts of Ontario and Quebec, the climate of which is similar to that of Ottawa. All the work here reported upon is carried out under the immediate supervision of the Dominion Cerealist.

WEATHER.

The spring of 1911 opened rather later than usual, and the sowing of the plots could not be commenced until April 28. It was, therefore, impossible to complete the seeding in good time, and those plots which were sown towards the last could not have been expected to give very good results, except in an unusually favourable season. Unfortunately, however, extremely hot weather set in almost immediately after the seeding was finished, thus making the conditions particularly trying for cereals.

The summer on the whole was characterized by exceptionally high temperatures and scanty rainfall. The extreme heat during the first week of July caused damage which was particularly noticeable in the peas. The continuous heat during the month hastened the ripening of all grain crops, so that the harvest was about as early as in 1910, although the time of sowing was later.

SMALL PLOTS OF CEREALS, ETC.

In addition to the numerous small plots of grain of cross-bred origin which are not yet fixed in character, there were grown at Ottawa last year in plots of less than one-sixtieth of an acre:—

75 new cross-bred varieties of spring wheat.
4 selected strains from named varieties of spring wheat.
14 new cross-bred varieties of oats.
4 selected strains from named varieties of oats.
29 new cross-bred varieties of barley.
24 selected strains from named varieties of barley.
17 new cross-bred varieties of peas.
3 selected strains from named varieties of flax.
15 new cross-bred varieties of beans.

The total was 150 new cross-bred varieties and 35 selected strains.

UNIFORM TEST PLOTS OF CEREALS, ETC.

The regular test plots of grain at Ottawa are one-sixtieth of an acre each, and those of field roots are one-hundredth of an acre.

The number of these test plots during the past season was as follows: Spring wheat 147, winter wheat 20, emmer and spelt 21, oats 55, six-row barley 72, two-row barley 40, peas 43, spring rye 3, winter rye 2, field beans 7, flax 19, turnips (Swedes) 10, mangels 8, carrots 5, sugar beets 3, Indian corn 34, making a total of 489 plots and representing about 450 varieties and selected strains.

SPRING WHEAT.

The regular test plots of spring wheat were sown on April 28 to May 4, the seed being used at the rate of about one and one-half bushels to the acre. The durum varieties are included in the table with the ordinary sorts of spring wheat, so that the relative yields of the different kinds may be more readily seen. The durum wheats were sown at the rate of about one and three-quarter bushels per acre.

The following table includes only the most important plots. The varieties mentioned without names are new cross-bred sorts, produced by the Dominion Cerealist, which are not yet ready for distribution. Those varieties which have a letter after the name are new strains propagated from single selected plants.

The yield per acre is expressed in pounds and also in 'bushels' of sixty pounds.

The character of the straw is indicated by marks on a scale of ten points, according to the proportion of the plot standing erect at harvest time.

*Named varieties and selected strains produced at the Central Experimental Farm are marked with an asterisk.

SPRING WHEAT—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average length of Straw including Head.	Strength of straw on a scale of 10 Points.	Average length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per measured bushel after cleaning.
					Inches		Inches.	Lbs.	Bu. Lbs.	Lbs.
1	363 D.	May 4	July 28	85	48	9	3½	2,520	42 ..	60·5
2	522 A.	"	" 31	88	48	9	3¼	2,310	38 30	61
3	Early Russians*	April 28	Aug. 5	99	48	5	4	2,190	36 30	63·5
4	522 B.	May 4	July 31	88	50	8	3¼	2,190	36 30	60·5
5	84 B 1.	April 29	" 28	90	48	9	3	2,160	36 ..	61
6	96 B.	" 29	Aug. 3	96	46	4	3¼	2,160	36 ..	63·2
7	Bishop*	" 28	July 28	91	48	8	3½	2,130	35 30	61·2
8	Yellow Cross*	" 29	" 31	93	48	7	3¼	2,100	35 ..	64
9	83 J.	" 29	" 31	93	46	8	3½	2,100	35 ..	58·5
10	521 B.	May 4	" 31	88	45	7	3½	2,100	35 ..	61
11	Preston H*	April 28	" 31	94	50	9	3¾	2,070	34 30	60·5
12	9 G. Beardless	" 29	Aug. 3	96	50	10	3½	2,070	34 30	58·2
13	Red Fife H*	" 28	" 8	102	46	10	3½	2,040	34 ..	60·5
14	177 A.	" 29	July 26	88	48	0	3	2,040	34 ..	58·5
15	Red Fern C*	" 28	Aug. 3	97	48	10	4	2,010	33 30	63
16	75 A	" 29	July 28	90	50	9	3½	2,010	33 30	63
17	82 C 2	" 29	" 31	93	48	8	3½	2,010	33 30	61·4
18	86 B.	" 29	" 27	89	48	8	3	2,010	33 30	62
19	86 D 2.	" 29	" 31	93	51	7	3¼	2,010	33 30	61
20	106 B.	" 29	" 30	92	46	8	3	2,010	33 30	62·2
21	Prospect*	" 28	" 27	90	48	9	3½	1,980	33 ..	59·5
22	74 A	" 29	" 27	89	46	6	2¾	1,980	33 ..	61·2
23	82 B 1.	" 29	" 28	90	48	10	3½	1,980	33 ..	61·5
24	178 B.	" 29	" 30	93	50	0	3½	1,980	33 ..	61·8
25	415 C.	May 4	Aug. 5	93	50	10	4¼	1,980	33 ..	58·5
26	422 B.	" 4	" 5	92	50	9	4	1,980	33 ..	57·2
27	Kubanka A*	April 28	" 6	100	56	6	2½	1,950	32 30	64
28	Red Fern B*	" 28	" 3	97	48	10	4	1,950	32 30	62·5
29	83 E.	" 29	July 31	93	46	9	3¼	1,950	32 30	59·4
30	197 C.	May 2	" 29	88	48	7	3¼	1,950	32 30	59
31	524 B.	" 4	" 26	83	46	10	3¼	1,950	32 30	59·5
32	Aurora*	April 28	" 19	82	42	10	3	1,920	32 ..	59
33	82 B 2.	" 29	" 31	93	50	7	3½	1,920	32 ..	60
34	128 B.	" 29	" 28	90	48	3	3¼	1,920	32 ..	61·5
35	227 C.	May 2	" 24	83	45	8	2¾	1,920	32 ..	60
36	353 A 2.	" 4	" 27	84	50	10	3	1,920	32 ..	61
37	Pringle's Champlain C*	April 28	Aug. 1	95	48	8	4	1,890	31 30	61·5
38	74 B.	" 29	" 3	96	45	10	3	1,890	31 30	59
39	489 A.	May 4	July 28	85	48	8	3½	1,890	31 30	60
40	129 D.	April 29	" 30	92	48	7	3¼	1,860	31 ..	62·4
41	362 C 3.	May 4	Aug. 4	92	44	10	3	1,860	31 ..	57·2
42	363 E 1.	" 4	July 30	87	46	4	3¼	1,860	31 ..	60
43	192 A.	April 29	" 28	90	48	0	3¼	1,830	30 30	61·5
44	199 B.	May 2	" 29	88	50	8	3	1,830	30 30	61·2
45	White Russian D*	April 29	Aug. 9	102	52	5	5	1,800	30 ..	59
46	84 A	" 29	July 23	90	48	4	3	1,800	30 ..	63·2
47	128 C.	" 29	" 24	86	44	9	3	1,800	30 ..	62·2
48	182 E.	" 29	" 28	90	47	7	2½	1,800	30 ..	62·2
49	523 D.	May 4	" 31	88	47	6	3½	1,800	30 ..	61·8
50	Kubanka B*	April 28	Aug. 6	100	56	6	2½	1,770	29 30	64
51	Outlook*	" 28	" 5	99	48	10	4	1,770	29 30	60·8
52	55 A	" 29	July 22	84	48	10	3¼	1,770	29 30	59
53	363 C.	May 4	" 31	88	45	7	3¼	1,770	29 30	60·5
54	520 A.	" 4	" 31	88	46	8	3¼	1,770	29 30	62
55	White Russian C*	April 29	Aug. 9	102	52	9	5	1,740	29 ..	60·2
56	123 B.	" 29	July 23	85	48	6	2½	1,740	29 ..	61·5
57	135 B. (Prelude)	" 29	" 20	82	42	10	2	1,740	29 ..	63
58	146 A.	" 29	Aug. 3	96	50	6	3¾	1,740	29 ..	56·5
59	195 F.	May 2	July 31	90	45	2	3¼	1,740	29 ..	61·2
60	234 B.	" 2	" 31	90	50	9	3½	1,740	29 ..	61
61	236 B.	" 2	Aug. 3	93	48	10	4	1,740	29 ..	59
62	Huron selected*	April 28	" 2	96	42	10	3¾	1,710	28 30	62
63	137 A.	" 29	July 30	92	50	2	4	1,710	28 30	57·2
64	201 D.	May 2	" 29	88	44	3	3	1,710	28 30	57·2
65	351 A.	" 4	" 28	85	46	9	3¼	1,710	28 30	59·8

SPRING WHEAT—Test of Varieties—*Continued.*

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average length of Straw including Head.	Strength of straw on a scale of 10 Points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per measured bushel after cleaning.
					Inch.		Inches.	Lbs.	Bu. Lbs	Lbs.
66	364 C	May 4	Aug. 1	89	46	3	3¾	1,710	28 30	56·5
67	Chelsea*	April 28	" 2	96	44	9	3¾	1,680	28 ..	61·2
68	354 C	May 4	July 30	87	44	0	3½	1,680	28 ..	59
69	507 B	" 4	" 31	88	45	4	3¼	1,680	28 ..	55
70	Goose	April 28	Aug. 7	101	52	5	2¾	1,650	27 30	63·2
71	Red Fife M*	" 28	" 8	102	46	10	3½	1,650	27 30	60·8
72	43 H	" 28	" 2	96	42	10	1¾	1,650	27 30	58
73	129 A	" 29	July 23	85	42	10	3	1,650	27 30	61·2
74	Kubanka C*	" 28	Aug. 6	100	56	6	2½	1,620	27 ..	64
75	109 B	" 29	July 29	91	46	8	3	1,620	27 ..	62·2
76	113 B	" 29	" 23	85	46	8	2¾	1,620	27 ..	62·5
77	168 B	" 29	Aug. 8	101	52	7	4½	1,620	27 ..	61·2
78	346 C	May 4	" 1	89	46	5	3½	1,620	27 ..	60·5
79	410 B	" 4	July 29	86	48	5	3½	1,620	27 ..	56·8
80	427 B	" 4	Aug. 1	89	48	10	4	1,620	27 ..	62·2
81	446 C	" 4	" 7	95	46	10	3½	1,620	27 ..	63
82	Onega*	April 28	July 21	84	44	10	2¾	1,590	26 30	58
83	513 A	May 4	" 28	85	48	1	3½	1,590	26 30	56
84	192 B 2	" 2	" 30	89	48	1	3½	1,560	26 ..	59·2
85	Roumanian	April 28	Aug. 8	102	52	8	2½	1,530	25 30	65·4
86	444 D	May 4	July 24	81	44	5	3	1,530	25 30	62·4
87	73 A	April 29	" 31	93	42	10	3¼	1,500	25 ..	55·5
88	445 B	May 4	" 28	85	46	3	3¼	1,500	25 ..	61·8
89	507 A	" 4	Aug. 5	93	46	2	4	1,500	25 ..	58
90	Hungarian White B*	April 28	" 1	95	48	10	4	1,470	24 30	61
91	Stanley A*	" 29	" 5	98	48	10	3¾	1,470	24 30	59·5
92	341 A	May 4	July 27	84	46	6	3	1,470	24 30	61
93	372 A	" 4	Aug. 7	95	50	10	4½	1,470	24 30	58
94	397 D	" 4	July 30	87	46	3	3	1,470	24 30	58·5
95	Hungarian White D*	April 28	Aug. 1	95	48	9	4	1,440	24 ..	61·4
96	87 A 1	" 29	" 2	95	52	5	3½	1,440	24 ..	60
97	87 B 1	" 29	" 1	94	46	8	3	1,440	24 ..	62
98	222 B	May 2	July 26	85	48	5	3	1,440	24 .	59·5
99	265 B	" 2	Aug. 4	94	50	10	4	1,440	24 ..	60·5
100	362 A	" 4	" 7	95	50	10	4	1,440	24 ..	60·2
101	Downy Riga*	April 28	July 22	85	48	10	2¾	1,410	23 30	61
102	Marquis*	" 28	" 31	94	46	10	3¼	1,410	23 30	62·8
103	6 F 2	" 29	Aug. 7	100	46	4	6½	1,380	23 ..	61·4
104	378 A	May 4	" 5	93	48	10	4	1,380	23 ..	57·2
105	431 B	" 4	July 30	87	48	10	3½	1,380	23 ..	61
106	446 A	" 4	Aug. 1	89	48	5	3¾	1,380	23 ..	57·5
107	492 A	" 4	July 28	85	48	5	3½	1,380	23 ..	58·5
108	495 B	" 4	" 28	85	46	7	3	1,350	22 30	60·8
109	Alpha Selected*	April 28	" 31	94	48	10	3½	1,320	22 ..	57·5
110	48 A	" 29	Aug. 1	94	46	10	3½	1,320	22 ..	58·5
111	402 F	May 4	July 28	85	50	4	3½	1,320	22 ..	61
112	438 B	" 4	" 28	85	45	10	3¼	1,320	22 ..	60·5
113	7 J 4	April 29	Aug. 2	95	52	10	4½	1,290	21 30	59·5
114	444 A	May 4	July 27	84	46	6	3	1,290	21 30	61
115	107 A	April 29	" 27	89	48	5	3	1,230	20 30	59
116	523 A 2	May 4	" 24	81	44	9	3¼	1,230	20 30	62
117	White Fife C*	April 29	Aug. 9	102	44	10	3¼	1,200	20 ..	60·5
118	Early Red Fife*	" 28	" 6	100	48	10	3¼	1,170	19 30	62
119	Red Fife (Indian Head seed)	" 28	" 8	102	46	10	3½	1,170	19 30	60·2
120	Yellow Queen*	" 29	July 31	93	50	7	3	1,170	19 30	61
121	442 A	May 4	" 26	83	44	10	3	1,170	19 30	60·5
122	98 A	April 29	" 30	92	48	0	3¾	1,110	18 30	55
123	446 H	May 4	Aug. 5	93	50	6	3¾	1,110	18 30	60·5
124	258 A	" 2	" 3	93	44	7	3¾	1,080	18 ..	59·4
125	334 C	" 4	July 30	87	46	10	4	1,050	17 30	61·2
126	Reliable	April 29	Aug. 7	100	46	10	3½	990	16 30	58·5
127	319 B	May 4	July 23	80	46	10	3	990	16 30	60·5
128	Bobs	April 28	" 31	94	44	10	3½	870	14 30	61·5
129	495 A	May 4	" 28	85	48	8	3½	660	11 ..	57·5
130	43 B	April 29	Aug. 14	107	50	7	3½	570	9 30	58·8

The average yield of the 130 plots was 1,657 lbs. (27 bushels 37 lbs.) per acre.

MOST PRODUCTIVE VARIETIES OF SPRING WHEAT AT OTTAWA.

Among the ordinary sorts of spring wheat, the following varieties have shown unusual productiveness for a series of years at Ottawa: Preston, Huron, Pringle's Champlain and Bishop. The first three are hard, red wheats with bearded heads. Bishop is a beardless, early, white wheat, not usually soft in character. These four varieties are good for flour production though the flour is not in the first rank for strength and colour.

Somewhat lower in yield but superior in the strength of their flour are Red Fife, Marquis and White Fife, all beardless.

The durum wheats, which, owing to their peculiar character and their unpopularity with millers, should only be grown for special purposes, give good yields at Ottawa, but are particularly productive in rather dry climates, where they usually produce larger crops than the ordinary types of spring wheat.

EARLY VARIETIES OF SPRING WHEAT.

For Ontario and the eastern provinces and for British Columbia, Huron and Preston are recommended as very satisfactory early-maturing varieties. Marquis is also good.

For the central provinces (Manitoba, Saskatchewan and Alberta) Marquis is recommended.

When extreme earliness is required the above sorts may be found unsuitable. the new cross-bred variety Prelude is being introduced to meet the demands for a wheat of excellent character and extreme earliness.

WINTER WHEAT.

The plots of winter wheat were sown on August 29, 1910, the seed being used at the rate of about one and three-quarter bushels to the acre. The soil selected for these plots was of a light and rather sandy character as it is found necessary, in the climate of Ottawa, to sow winter wheat only on land where water cannot lie in spring or during any thaw in the winter months. The wheat made good growth in the autumn, stood the winter well, and gave a large yield.

The yield per acre is expressed in pounds and also in 'bushels' of sixty pounds.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average length of Straw including head.	Strength of straw on a scale of 10 points.	Average length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after cleaning
					Inches.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	American Banner.....	Aug. 29	July 17	322	55	6	3½	3,210	53	30	60 8
2	Dawson's Golden Chaff...	" 29	" 19	324	58	8	4	3,060	51	..	61
3	Buda Pesth.....	" 29	" 15	320	57	5	3¼	2,820	47	..	61
4	Imperial Amber.....	" 29	" 19	324	58	7	4½	2,820	47	..	60·5
5	Jones' Winter Fife.	" 29	" 17	322	58	5	4	2,760	46	..	62·5
6	Egyptian Amber.....	" 29	" 19	324	58	6	3¾	2,550	42	30	62
7	Red Velvet Chaff.....	" 29	" 19	324	57	10	4	2,220	37	..	62·2
8	Tasmania Red	" 29	" 20	325	60	8	4	2,130	35	30	61.5
9	Turkey Red No. 580.....	" 29	" 21	326	50	4	3	1.830	30	30	62

The average yield of the 9 plots was 2,600 lbs. (43 bushels 20 lbs.) per acre.

RECOMMENDED VARIETIES OF WINTER WHEAT.

The climate of Ottawa being too severe for the regular production of good crops of winter wheat, the average yields obtained here would scarcely serve as a satisfactory guide for farmers in southern Ontario. Some recommendations in regard to varieties of winter wheat may, however, be given.

One of the best varieties in the field is Dawson's Golden Chaff (beardless). It has the disadvantage, however, of giving flour which is low in baking strength and therefore suitable for crackers, cakes, etc., but not for light bread. The gluten content of this variety is not high enough to make it quite satisfactory for the production of rolled wheat and other similar cereal products, though it is used for these purposes.

Turkey Red (bearded) yields the strongest flour, but does not as a rule give, in Ontario, as large a yield of grain per acre as some of the other sorts.

Egyptian Amber (bearded) and Tasmania Red (bearded) give good yields of grain and produce very good flour for bread making.

Imperial Amber (bearded) is another variety which can also be recommended both for its high yield and the very fair strength of its flour.

EMMER AND SPELT.

The plots of Emmer and Spelt were sown on April 28, the seed being used at the rate of about one hundred and twenty pounds (or four bushels by measure) to the acre.

Common Emmer (often incorrectly called 'Speltz') is one of the best varieties, being less coarse and containing a larger proportion of kernel than most of the other sorts.

The varieties without names are new cross-bred sorts produced by the Dominion Cerealist.

EMMER AND SPELT—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of straw including head.	Strength of straw on a scale of 10 points.	Average Length of Head	Yield of Grain per Acre.	Weight per measured bushel after cleaning.
					Ins.		Ins.	Lbs.	Lbs.
1	44 G	April 28	July 25.	88	45	9	2¼	2,700	41
2	Double Emmer	" 28	Aug. 1..	95	36	2	2	2,160	34
3	44 H	" 28	July 25..	88	44	8	2¼	2,160	37·5
4	45 E	" 28	" 25..	88	44	10	2¼	2,130	34·5
5	9 K 2	" 28	Aug. 2..	96	36	2	2	2,010	31·2
6	43 E	" 28	" 2.	96	47	3	2	2,010	29·5
7	Common Emmer	" 28	" 3..	97	38	5	2	1,920	36
8	Red Emmer	" 28	" 9..	103	48	8	3½	1,920	35
9	46 G	" 28	July 31..	94	40	10	2	1,890	41
10	46 D	" 28	" 26.	89	42	10	2¼	1,860	41
11	43 F	" 28	Aug. 5..	99	40	6	2¾	1,680	33·8
12	55 C	" 28	July 25..	88	42	5	1¾	1,650	35·5
13	44 D	" 28	Aug. 1..	95	44	3	2	1,620	36·8
14	45 G	" 28	" 1..	95	45	8	2¼	1,500	40·5
15	55 E	" 28	July 28..	91	46	10	2½	1,500	33·2
16	Red Spelt	" 28	Aug. 10..	104	48	9	4¾	1,440	27
17	Smooth Spelt	" 28	" 10..	104	48	10	5¼	1,320	25
18	44 A	" 28	" 2..	96	42	2	2½	1,320	30
19	White Spelt	" 28	" 10..	104	48	8	5½	1,290	27

The average yield of the nineteen plots was 1,794 lbs. per acre.

OATS.

The varieties under numbers are new cross-bred kinds produced at Ottawa. All of them have the Chinese Naked oat as one parent and have inherited from that variety the peculiarity of threshing out free from hull.

The name of the selected strain obtained from Sixty Day (which has been designated as Sixty Day White in previous reports) has been changed to Eighty Day: a name which is not misleading as to the early maturing character of this oat at Ottawa.

The oat plots were sown on May 12 the seed being used at the rate of about two bushels per acre for most varieties, but in greater quantities whenever the oats were of unusually large size.

The yield per acre is expressed in pounds and also in 'bushels' of thirty-four pounds.

*Named varieties and selected strains produced at the Central Experimental Farm are marked with an asterisk.

OATS.—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of Straw on a Scale of 10 Points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per measured bushel after cleaning
					In.		In.	Lbs.	Bush. Lbs.	Lbs.
1	Banner L*	May 12	Aug. 8	88	50	8	9	2,790	82 2	31
2	Banner K*	" 12	" 8	88	50	9	9	2,700	79 14	32·5
3	Victory	" 12	" 8	88	41	10	8½	2,700	79 14	37·5
4	Improved American	" 12	" 8	88	44	10	8	2,670	78 18	33·5
5	Banner B*	" 12	" 7	87	50	9	8	2,640	77 22	32
6	Irish Victor	" 12	" 8	88	46	9	8¾	2,580	75 30	34·5
7	Banner J*	" 12	" 8	88	50	9	9	2,520	74 4	31·2
8	Banner M*	" 12	" 8	88	50	10	9	2,490	73 8	30
9	Abundance D*	" 12	" 9	89	46	9	9	2,430	71 16	34 4
10	Daubeney Selected*	" 12	July 27	76	38	10	6	2,400	70 20	33·5
11	Danish Island	" 12	Aug. 7	87	45	10	9	2,370	69 24	34
12	Gold Rain	" 12	" 5	85	38	10	7½	2,370	69 24	37·8
13	American Beauty C*	" 12	" 9	89	51	4	8	2,340	68 28	33·5
14	Swedish Black	" 12	July 28	77	44	7	9½	2,340	68 28	33·4
15	Twentieth Century	" 12	Aug. 5	85	42	10	8	2,340	68 28	35·5
16	Green Mountain	" 12	" 9	89	42	10	9	2,310	67 32	35·2
17	Thousand Dollar	" 12	" 5	85	44	10	8	2,280	67 2	36
18	Eighty Day*	" 12	July 23	72	40	9	6¼	2,250	66 6	30·5
19	478 D	" 12	Aug. 8	88	45	10	10	2,250	66 6	33·3
20	Siberian	" 12	" 8	88	42	10	8	2,220	65 10	33·8
21	Swedish Select	" 12	" 5	85	42	9	8	2,220	65 10	36
22	American Beauty B*	" 12	" 9	89	51	3	8	2,160	63 18	33
23	Abundance A*	" 12	" 9	89	44	7	9	2,130	62 22	32·5
24	Black Mesdag	" 12	July 27	76	42	9	8	2,100	61 26	33·5
25	Ligowo Swedish	" 12	Aug. 2	82	40	8	7	2,100	61 26	34·5
26	Abundance, Garton's Regenerated	" 12	" 8	88	46	5	9	2,070	60 30	35·3
27	Early Ripe F*	" 12	July 27	76	38	10	6	1,890	55 20	28
28	Early Ripe G*	" 12	" 27	76	38	10	6	1,860	54 24	30·5
29	Alpine	" 12	Aug. 7	87	51	3	8½	1,830	53 28	31·5
30	477 T	" 12	" 8	88	38	10	7½	1,770	52 1	47·2
31	Bergs	" 12	" 9	89	46	9	8	1,710	50 10	31·5
32	Early Ripe E*	" 12	July 27	76	38	9	6	1,680	49 14	31
33	477 G	" 12	Aug. 2	82	37	10	8½	1,650	48 18	47·8
34	477 X	" 12	" 9	89	42	10	6½	1,590	46 26	49·5
35	480 L	" 12	" 5	83	40	10	7¾	1,560	45 30	49
36	Pioneer	" 12	" 5	85	36	10	7¾	1,500	44 4	33·5
37	Tartar King	" 12	" 5	85	40	10	8	1,500	44 4	27·5
38	477 E	" 12	" 2	82	37	10	8½	1,500	44 4	45
39	477 Q	" 12	" 12	92	44	10	7	1,410	41 16	45
40	Early Blonde	" 12	" 16	96	40	8	7½	1,380	40 20	27·5
41	Excelsior	" 12	" 8	88	36	10	7½	1,350	39 24	31·5
42	477 D	" 12	" 8	88	36	10	7	1,290	37 32	43
43	479 A	" 12	" 7	87	40	10	8¼	1,230	36 6	48
44	479 L	" 12	" 7	87	36	10	7⅓	1,110	32 22	44·5
45	479 N	" 12	" 10	90	44	10	7¾	1,110	32 22	45·8
46	480 J	" 12	" 1	81	38	10	7½	1,080	31 26	47
47	479 M	" 12	" 5	85	38	10	7	1,020	30 ..	50·2
48	479 Q	" 12	" 7	87	42	10	9	900	26 16	47·5
49	477 H	" 12	" 16	96	42	10	8	870	25 20	44 5
50	479 B	" 12	" 10	90	42	10	7¾	780	22 32	43·2
51	480 A	" 12	" 8	88	40	10	7	780	22 32	49
52	479 P	" 12	" 2	82	36	10	7½	570	16 26	45·5
53	479 D	" 12	" 2	82	38	10	7½	510	15 ..	49

The average yield of the 53 plots was 1,834 lbs. (53 bushels 33 lbs.) per acre.

MOST PRODUCTIVE VARIETIES OF OATS.

Among the most productive kinds of oats, the following white varieties deserve special mention: Thousand Dollar, Twentieth Century, Improved American, Banner, Garton's Abundance and Danish Island. One or more of these kinds can be obtained from any good seedsmen. Gold Rain is a very productive yellow oat. Among black oats, the English varieties, Pioneer and Excelsior, have given the best returns on the Central Farm during the past few years, but they have not proved so productive as the best white kinds.

EARLIEST VARIETIES OF OATS.

The varieties called Eighty Day and Early Ripe are extremely early in ripening, but cannot be recommended for general purposes, though they may be useful in certain special cases. Sixty Day and Orloff are commercial kinds resembling Eighty Day. The name Sixty Day is misleading. Somewhat less early, but probably more satisfactory as a rule, are Daubeney and Tartar King. These oats are obtainable in commerce, but farmers will usually find some of the later varieties more productive.

SIX-ROW BARLEY.

The plots were sown on May 9, the seed being used at the rate of about two bushels to the acre. The land on which it was necessary to place the plots varied somewhat in character, so that the yields given in the following table are not very trustworthy.

The excessively hot weather seriously affected the yield and quality of the barley crop.

The yield per acre is expressed in pounds, and also in 'bushels' of forty-eight pounds.

The varieties under numbers are new cross-bred sorts produced by the Dominion Cerealist. Many of them are hulless, as may be seen from their high weight per bushel.

*Named varieties and selected strains produced at the Central Experimental Farm are marked with an asterisk.

Six-Row Barley—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per measured bushel after cleaning
					In.		In.	Lbs.	Bush. Lbs.	Lbs.
1	Albert*	May 9	July 27	79	40	10	3¼	2,880	60 ..	46
2	Stella G.*	" 9	" 26	78	42	9	3½	2,760	57 24	46
3	Odessa D.*	" 9	" 28	80	35	9	3¾	2,730	56 42	43·2
4	Manchurian G.*	" 9	" 27	79	40	10	3½	2,640	55 ..	45·2
5	Manchurian H.*	" 9	" 27	79	40	10	3½	2,580	53 36	46·2
6	Taganrog*	" 9	" 24	76	36	8	3	2,580	53 36	44·2
7	Manchurian A.*	" 9	" 27	79	40	10	3½	2,550	53 6	46
8	Oderbruch	" 9	" 28	80	38	10	3½	2,550	53 6	45·5
9	O. A. C. No. 21	" 9	" 27	79	42	10	3½	2,520	52 24	45·2
10	Nugent*	" 9	" 27	79	40	10	3¾	2,490	51 42	45·4
11	Black Japan	" 9	" 25	77	33	10	2½	2,460	51 12	45
12	Odessa F.*	" 9	" 28	80	38	9	3¾	2,460	51 12	46
13	Odessa C.*	" 9	" 28	80	35	10	3¾	2,340	48 36	45·2
14	Escourgeon	" 9	" 28	80	37	10	3½	2,310	48 6	47
15	Stella C.*	" 9	" 26	78	42	9	3½	2,310	48 6	45·4
16	Success B.*	" 9	" 20	72	40	10	3	2,280	47 24	44·5
17	582 E	" 9	" 31	83	38	10	3	2,280	47 24	40
18	Stella A.*	" 9	" 26	78	42	10	3½	2,190	45 30	46·2
19	475A	" 9	Aug. 1	84	30	10	3¼	2,190	45 30	45
20	460A	" 9	July 23	75	30	9	1½	2,160	45 ..	58·5
21	Blue Short Head A*	" 9	Aug. 2	85	28	10	2¼	2,100	43 36	44·5
22	465 C	" 9	July 24	76	32	10	2	1,980	41 12	62
23	475 L	" 9	" 20	72	26	10	2	1,980	41 12	46
24	560 H	" 9	" 24	76	40	9	3¼	1,950	40 30	40
25	466 A	" 9	" 24	76	30	8	2½	1,920	40 ..	56·8
26	475 K 2	" 9	" 20	72	30	10	2	1,920	40 ..	42
27	466 E	" 9	" 29	81	30	10	3	1,860	38 36	55
28	Blue Short Head C*	" 9	Aug. 2	85	28	10	2¼	1,830	38 6	44
29	563 B 1	" 9	July 27	79	33	10	3	1,830	38 6	57·4
30	463 A	" 9	" 27	79	36	5	2	1,800	37 24	47
31	466 C	" 9	" 24	76	34	10	3	1,800	37 24	58
32	472 A	" 9	" 22	74	30	9	2¼	1,800	37 24	59·8
33	557 D	" 9	" 24	76	36	10	3	1,800	37 24	40·4
34	462 C	" 9	" 28	80	40	8	2¾	1,770	36 42	58·8
35	565 A	" 9	" 28	80	38	10	3¾	1,770	36 42	46·5
36	563 A 1	" 9	" 28	80	32	10	3¾	1,770	36 42	55·2
37	471 D 3	" 9	" 22	74	28	10	2¼	1,740	36 12	60
38	574 B	" 9	" 28	80	30	10	2½	1,740	36 12	58·2
39	564 C	" 9	" 27	79	30	10	3	1,680	35 ..	45
40	Early Indian*	" 9	" 15	67	30	4	2	1,620	33 36	42
41	467B	" 9	" 24	76	36	10	3	1,590	33 6	57·2
42	459B	" 9	" 27	79	35	9	2¾	1,500	31 12	58·5
43	461A	" 9	Aug. 3	86	36	10	2½	1,500	31 12	61
44	465A 2	" 9	July 27	79	35	8	2¾	1,500	31 12	60·8
45	467C	" 9	" 27	79	30	10	2¾	1,470	30 30	51·5
46	462D	" 9	" 28	80	36	7	2½	1,410	29 18	57·2
47	475C	" 9	Aug. 10	93	28	10	3	1,380	28 36	46
48	458B	" 9	July 22	74	38	10	3	1,380	28 36	46·2
49	475B	" 9	" 24	76	24	10	2¼	1,290	26 42	43·2
50	Triumph	" 9	Aug. 2	85	32	8	3¼	1,260	26 12	42·2
51	471 C	" 9	" 2	85	30	10	2¼	1,200	25 ..	55
52	465 B	" 9	July 31	83	30	10	2	1,140	23 36	60·8
53	468 A	" 9	Aug. 10	93	28	10	3¼	1,140	23 36	52·8
54	581 B2	" 9	July 22	74	22	10	2¼	1,140	23 36	56
55	574 C	" 9	" 24	76	40	9	3¼	1,110	23 6	43·5
56	579 B	" 9	" 22	74	25	9	2	1,110	23 6	56·2
57	464 A	" 9	" 27	79	30	8	2¼	1,080	22 24	57
58	464 E	" 9	" 28	80	35	9	3	1,050	21 42	54·5
59	575 A2	" 9	" 23	75	38	7	3¾	1,020	21 12	38
60	578 B1	" 9	" 24	76	36	8	3	1,020	21 12	40
61	476 C	" 9	Aug. 8	91	34	10	2¼	930	19 18	41
62	578 A	" 9	July 24	76	36	9	3	900	18 36	50
63	462 B	" 9	Aug. 3	86	36	10	2	870	18 6	57

SIX-ROW BARLEY—TEST OF VARIETIES—*Continued.*

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after cleaning
					In.		In.	Lbs.	Bus.	Lbs.	Lbs.
64	557 C1	May 9	July 22	74	35	10	3	870	18	6	40·5
65	469 D	" 9	" 27	79	27	10	2½	780	16	12	52·5
66	466 D	" 9	Aug. 10	93	28	10	2⅝	750	15	30	54
67	475 H2	" 9	" 14	97	35	10	3¼	720	15	..	37·5
68	469 B	" 9	July 27	79	27	10	2½	690	14	18	53·2
69	476 E	" 9	" 28	80	22	10	2¼	660	13	36	40·4
70	466 B	" 9	Aug. 14	97	32	10	2¾	600	12	24	47
71	468 B	" 9	" 10	93	32	10	3	600	12	24	50·8
72	476 D	" 9	" 14	97	32	10	2¼	480	10	..	37·8

The average yield of the 72 plots was 1,667 lbs. (34 bushels 35 lbs.) per acre.

MOST PRODUCTIVE VARIETIES OF SIX-ROW BARLEY.

Among the most productive sorts which have been tested for several years at this Farm are Manchurian A and Odessa. Manchurian is a selected strain of Mensury. Owing to the superiority of the selected strain the parent variety has been dropped.

EARLIEST VARIETIES OF SIX-ROW BARLEY.

Manchurian and Odessa are among the earliest sorts of six-row barley that have been tested. Some of the new cross-bred varieties, which are not yet named, mature more rapidly. These are not yet available for distribution.

BEARDLESS SIX-ROW BARLEY.

The variety known as Champion has been discontinued, and a selection made from Success is being grown instead. Success is earlier than Champion, but neither variety gives a large yield. Several of the new cross-bred sorts mentioned in the table are beardless. It is hoped that some of them will prove superior to the older, named sorts.

HULLESS SIX-ROW BARLEY.

The common sorts of hulless barley known as Hulless White and Hulless Black are characterized by such weak straw that they have been dropped from our list. Several of the new cross-bred sorts mentioned in the table are hulless and some of them display a fair strength of straw.

TWO-ROW BARLEY.

The plots were sown on May 4 and 5. The seed was used at the rate of about two bushels to the acre. The soil varied considerably in character, which caused very irregular returns from the plots.

Gold barley, a new variety from Sweden, kindly supplied by Mr. L. H. Newman, did not reach us until after the regular plots had been sown. It was sown on May 13.

The varieties under numbers are new cross-bred sorts produced by the Dominion Cerealist.

*Named varieties and selectd strains produeed at the Central Experimental Farm are marked with an asterisk.

Two-Row Barley—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average length of straw including head.	Strength of Straw on a Scale of 10 points.	Average length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after cleaning
					Inches.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	475 M	May 5	July 21	77	42	5	3½	3,000	62	24	49
2	Kutais *	" 5	" 22	78	42	0	3¾	2,790	58	6	48
3	Early Chevalier *	" 4	" 22	79	46	3	3¼	2,640	55	..	47
4	Hannchen	" 4	" 28	85	39	1	3½	2,580	53	36	45·8
5	Gordon A *	" 4	" 28	85	50	3	2¾	2,460	51	12	50·2
6	Swan's Neck	" 5	" 31	87	40	5	3	2,460	51	12	48
7	Gordon E *	" 4	" 28	85	50	1	2¾	2,430	50	30	47
8	Gordon D *	" 4	" 28	85	50	1	2¾	2,400	50	..	45 5
9	Caucasian Hulless	" 4	" 26	83	30	3	3½	2,370	49	18	57
10	French Chevalier	" 4	" 30	87	45	5	3⅓	2,310	48	6	47·8
11	Duckbill B *	" 4	Aug. 3	91	40	10	3	2,250	46	42	49·5
12	476 A	" 5	July 31	87	44	3	3¾	2,250	46	42	45.8
13	Duckbill C *.	" 4	Aug. 3	91	40	10	3	2,220	46	12	50·2
14	Gordon B *	" 4	July 28	85	50	1	2¾	2,160	45	..	45
15	567 A	" 5	" 31	87	40	1	4	2,160	45	..	55·4
16	581 B1	" 5	" 23	79	36	3	3½	2,160	45	..	55
17	558 A	" 5	" 22	78	48	3	3¼	2,130	44	18	42·4
18	Canadian Thorpe E *	" 4	Aug. 1	89	38	9	3¼	2,100	43	36	50
19	Jarvis *	" 5	July 26	82	48	10	4¼	2,100	43	36	49
20	Beaver B *	" 4	" 24	81	52	10	4¼	2,070	43	6	47·2
21	Beaver E *	" 4	" 24	81	52	8	4¼	2,040	42	24	48·2
22	Canadian Thorpe D *	" 4	Aug. 1	89	38	9	3¼	2,040	42	24	48·5
23	476 B	" 5	" 3	90	40	10	2¾	2,040	42	24	44
24	Clifford *	" 4	July 28	85	48	3	4	1,980	41	12	47
25	475 D	" 5	" 30	86	40	10	2¾	1,950	40	30	43
26	Standwell	" 5	" 27	83	49	5	3⅛	1,920	40	..	50·2
27	475 E	" 5	" 30	86	48	3	3¾	1,920	40	..	44
28	557 B	" 5	" 22	78	48	6	3¼	1,920	40	..	45·2
29	Swedish Chevalier	" 5	Aug. 1	88	40	3	4	1,890	39	18	47
30	Gold	" 13	" 12	91	32	10	3½	1,890	39	18	48·2
31	Beaver D *	" 4	July 25	82	52	6	4¼	1,860	38	36	47·5
32	Leader	" 5	Aug. 3	90	40	8	3	1,830	38	6	48·5
33	Primus	" 5	" 3	90	44	10	3	1,770	36	42	49·8
34	579 C	" 5	July 27	83	44	5	3	1,740	36	12	55·5
35	Invincible	" 5	Aug. 3	90	40	10	3	1,650	34	18	49 8
36	475 H1	" 5	" 12	99	46	8	4	1,620	33	36	44
37	Black Two-row	" 4	" 1	89	24	5	4	1,500	31	12	48·5
38	578 D	" 5	July 22	78	45	6	3	1,350	28	6	55·2
39	578 C	" 5	" 22	78	45	3	3	1,260	26	12	51·5
40	475 J	" 5	Aug. 13	100	46	2	4	1,020	21	12	42·2

The average yield of the 40 plots was 2,056 lbs. (42 bushels 40 lbs.) per acre.

MOST PRODUCTIVE VARIETIES OF TWO-ROW BARLEY.

The following varieties are among the most productive: Hannchen (a Swedish selection of the famous Hanna barley), Swan's Neck, Standwell, Clifford, Canadian Thorpe, Beaver and the different strains of Chevalier.

EARLIEST AND HULLESS TWO-ROW BARLEY.

Among the earlier sorts are Hannchen, Beaver, Clifford and some strains of Chevalier.

BEARDLESS AND HULLESS TWO-ROW BARLEY.

The varieties of beardless and of hulless two-row barley which have been tested at Ottawa have not, as a rule, shown sufficient strength of straw to make them

profitable sorts for farmers to cultivate. The variety called Caucasian Hulless, which has now been tested for five years, has given good yields, but it cannot be unreservedly recommended, as the straw has shown decided indications of weakness in some seasons.

PEAS.

The plots of peas were sown May 10 and 11, the seed being used at the rate of two or three bushels to the acre, according to the size of the pea.

The variety named Solo is a new, brownish pea from Sweden, which was supplied to this Farm by Mr. L. H. Newman.

The yield per acre is expressed in pounds and also in 'bushels' of sixty pounds.

Varieties under numbers are new cross-bred sorts produced by the Dominion Cerealist.

*Named varieties and selected strains produced at the Central Experimental Farm are marked with an asterisk.

FIELD PEAS—Test of Varieties.

Number.	Name of Variety.	Size of Pea.	Date of Sowing.	Date of Ripening.	Number of days Maturing.	Average length of Straw.	Average length of pod.	Yield of grain per acre.	Yield of Grain per acre.	Weight per measured bushel after cleaning
						In.	In.	Lbs.	Bush. Lbs.	Lbs.
1	30 D	Medium	May 11.	Aug. 9.	90	55	2¼	1,980	33 ..	62·2
2	Arthur Selected*	"	" 10.	" 14.	96	45	2½	1,680	28 ..	63
3	30 J	"	" 11.	" 10.	91	50	2½	1,680	28 ..	63
4	Picton*	"	" 10	" 15.	97	75	2¼	1,590	26 30	63·4
5	26 A	"	" 11.	" 16.	97	55	2¼	1,500	25 ..	62·4
6	Golden Vine	Small ..	" 10.	" 16.	98	70	2¼	1,470	24 30	63·4
7	19 B 1	Medium	" 10.	" 14.	96	55	2½	1,470	24 30	62·3
8	30 K 2	"	" 11.	" 10.	91	48	2¼	1,470	24 30	63·5
9	35 B	Large...	" 11.	" 8.	89	55	2¼	1,470	24 30	62
10	35 D	Medium	" 11.	" 2.	83	40	2	1,470	24 30	63·5
11	19 F	"	" 10.	" 14.	96	60	2½	1,440	24 ..	63
12	37 D	Large...	" 11.	" 2.	83	40	2	1,440	24 ..	62
13	Chancellor	Small ..	" 10.	" 13.	95	70	2¼	1,380	23 ..	63
14	Prince*	Large...	" 10.	" 15.	97	70	2½	1,350	22 30	62·2
15	36 A	"	" 11.	" 10.	91	50	2¼	1,320	22 ..	63·2
16	Daniel O'Rourke	Small ..	" 10.	" 16.	98	70	2¼	1,260	21 ..	63·5
17	English Grey	Medium	" 10.	" 16.	98	70	2½	1,260	21 ..	62·5
18	Wisconsin Blue	"	" 10.	" 17.	99	65	2¼	1,260	21 ..	63·5
19	20 E	"	" 10.	" 14	96	70	2½	1,260	21 ..	63
20	30 C	"	" 11.	" 17.	98	60	2	1,230	20 30	63·5
21	Paragon*	"	" 10.	" 14.	96	65	2¼	1,200	20 ..	63·5
22	White Marrowfat	Large...	" 10	" 17.	99	70	2½	1,200	20 ..	63·4
23	31 C	Medium	" 11.	" 10.	91	48	2¼	1,200	20 ..	63
24	32 D	"	" 11.	" 2.	83	50	2¼	1,200	20 ..	62
25	Mackay*	"	" 10.	" 13	95	65	2¼	1,170	19 30	62·5
26	37 B	"	" 11.	" 17.	98	55	2¼	1,140	19 ..	64
27	23 H	Large...	" 11.	" 14.	95	50	2¼	1,080	18 .	61
28	Black-eye Marrowfat	"	" 10.	" 18.	100	65	2¾	1,050	17 30	62
29	22 E	Medium	" 11.	" 13.	94	50	2½	1,050	17 30	62
30	Solo	Large...	" 11.	" 17.	98	60	2½	1,020	17 ..	61·2
31	Prussian Blue	Medium	" 10.	" 13.	95	65	2½	960	16 ..	62·2
32	23 F 1	"	" 11.	" 14.	95	45	2	900	15 ..	63·8
33	23 B	"	" 11.	" 18.	99	60	2½	780	13 ..	63
34	21 D	Large...	" 11.	" 8.	89	50	2½	720	12 ..	61
35	21 B	Medium	" 10.	" 15.	97	55	2½	690	11 30	64·5
36	23 R1	"	" 11.	" 12.	93	45	2¼	330	5 30	64·2
37	23 R 6 B	"	" 11.	" 14.	95	55	2½	300	5 ..	62·8

The average yield of the 37 plots was 1,215 lbs. (20 bushels 15 lbs.) per acre.

RECOMMENDED VARIETIES OF PEAS.

Prussian Blue, Arthur and Chancellor are among the most productive sorts, and are also early in ripening. The Marrowfat varieties and Golden Vine are somewhat later in maturing. Most of these varieties can be obtained from seedsmen in Canada.

Arthur is particularly desirable on account of its high yield and earliness in maturing.

SPRING RYE.

The plots of spring rye were sown on April 28, the seed being used at the rate of about one and one-half bushels to the acre.

The yield per acre is expressed in pounds and also in 'bushels' of fifty-six pounds.

SPRING RYE—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after cleaning
					Inches.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Ottawa Select.....	Apr. 28	July 27	90	56	8	4	2,100	37	28	57·2
2	Common.....	" 28	" 27	90	58	8	3½	2,010	35	50	57

The average yield of the two varieties was 2,055 lbs. (36 bushels 39 lbs.) per acre.

WINTER RYE.

The plots of winter rye were sown on August 29, 1910, the seed being used at the rate of about one and one-half bushels to the acre. The rye made good growth in the autumn and stood the winter well.

The yield per acre is expressed in pounds and also in 'bushels' of fifty-six pounds.

WINTER WHEAT—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after cleaning
					Inches.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Dominion.	Aug. 29	July 18	323	54	4	4¼	3,030	54	6	54·5
2	Mammoth White.....	" 29	" 14	319	56	5	4¼	2,910	51	54	55
3	Thousandfold.....	" 29	" 18	323	55	4	4¼	2,730	48	42	53

The average yield of the three varieties was 2,890 lbs. (51 bushels 34 lbs.) per acre.

FIELD BEANS.

Seven plots of beans, one-sixtieth of an acre each, were sown on May 20 and 22. All of the varieties sown were selected strains of field beans or of early-maturing garden sorts which may prove useful in localities where it is desired to obtain ripe seed in a short season.

The yield per acre is expressed in pounds and also in 'bushels' of sixty pounds.

FIELD BEANS—Test of Varieties.

Number.	Name of Variety.	Distances between rows.	Date of Sowing	Date of Ripening.	Number of Days Maturing.	Average Length of Plant.	Average Length of Pod.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after cleaning.
						In.	In.	Lbs.	Bush.	Lbs.	Lbs.
1	Norwegian Brown Selected..	16	May 22	Aug. 8	78	12	4	2,400	40	..	61·5
2	Golden Wax Selected.....	16	" 20	" 12	84	18	3	1,800	30	..	64·2
3	Challenge Black Wax Selected.....	16	" 20	" 8	80	10	2¾	1,290	21	30	61·5
4	Stringless Kidney Wax Selected.....	16	" 22	" 13	83	12	2½	1,200	20	..	61·8
5	California Pea Selected.....	16	" 20	" 21	93	18	3¼	900	15	..	65·0
6	Marrowfat Selected.....	20	" 20	Sept. 14	117	40	3¾	630	10	30	61·5
7	White Field Selected.....	20	" 22	" 14	115	25	3¼	420	7	.	64·5

The average yield of the seven varieties was 1,234 lbs. (20 bushels 34 lbs.) per acre.

FLAX.

Nineteen selected strains from various commercial sorts of flax were grown in sixtieth-acre plots.

The seed was sown on May 20, at the rate of sixty pounds to the acre. The very unfavourable, hot weather caused the crop to be almost a total failure.

FIELD ROOTS.

All the field roots were sown on May 17, and were harvested as follows: Mangels, October 23, Carrots and Sugar Beets, October 24, Turnips, October 25.

The yield per acre of the field roots is calculated from the weight of the crop gathered from one-hundredth of an acre.

Before sowing, the land was made up in drills two feet apart and rolled with a heavy land roller, which flattened the drills nearly one-half, leaving a firm seed bed. When the young plants were about three inches high they were thinned out, leaving them about eight or ten inches apart in the rows in the case of turnips, twelve inches for mangels, and six inches for carrots and sugar beets.

It is probable that, in some instances, varieties which are mentioned in these tables under different names are identical in all essential respects.

In Canada the ton contains 2,000 pounds.

Turnips—Test of Varieties.

Number.	Name of Variety.	Yield per Acre. Tons.	Lbs.
1	Hall's Westbury	32	1,500
2	Good Luck	30	1,600
3	Hartley's Bronze	28	1,400
4	Halewood's Bronze Top	25	1,200
5	Carter's Elephant	25	500
6	Jumbo	21	500
7	Perfection Swede	20	1,400
8	Bangholm Selected	19	1,100
9	Mammoth Clyde	18	1,300
10	Magnum Bonum	17	100

The average yield from the ten plots was 24 tons 60 lbs. per acre.

Mangels—Test of Varieties.

Number.	Name of Variety.	Yield per Acre. Tons.	Lbs.
1	Giant Yellow Globe	28	1,700
2	Half Sugar White	28	100
3	Giant Yellow Intermediate	24	1,600
4	Selected Yellow Globe	23	900
5	Gate Post	21	1,200
6	Perfection Mammoth Long Red	18	1,700
7	Prize Mammoth Long Red	18	1,500
8	Yellow Intermediate	18	1,300

The average yield from the eight plots was 22 tons, 1,750 lbs. per acre.

Carrots—Test of Varieties.

Number.	Name of Variety.	Yield per Acre. Tons.	Lbs.
1	Mammoth White Intermediate	25	600
2	Half Long Chantenay	21	1,000
3	Improved Short White	18	1,500
4	White Belgian	18	1,500
5	Ontario Champion	18	..

The average yield from the five plots was 20 tons, 920 lbs. per acre.

SUGAR BEETS—Test of Varieties.

Number.	Name of Variety.	Yield per acre.	
		Tons.	Lbs.
1	French Very Rich	19	1,800
2	Klein Wanzleben	16	700
3	Vilmorin's Improved	14	400

The average yield from the three plots was 16 tons, 1,633 lbs. per acre.

INDIAN CORN.

The corn was sown with the seed drill in rows thirty-five inches apart, and was also sown in hills thirty-five inches apart each way. When the plants were about six inches high they were thinned out, leaving them from six to eight inches apart in the rows, and leaving four or five plants in each hill. The seed was sown on May 26 and the corn was cut green for ensilage September 20. The yield has been calculated from the weight of crop cut from two rows, each sixty-six feet long.

For the making of ensilage, the corn should be cut when the kernels are in the doughy stage; but the summer at Ottawa is not always warm enough to bring the late varieties to this stage of maturity before it is necessary to cut the crop to avoid serious frost.

INDIAN CORN FOR ENSILAGE—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Cutting.	Average Height.	Condition when Cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
				Inches.		Tons.	Lbs.	Tons.	Lbs
1	Superior Fodder	May 26	Sept. 20	84	Early milk	15	1,350	17	870
2	Early Mastodon	" 26	" 20	75	"	15	1,020	19	500
3	Eureka	" 26	" 20	82	"	14	1,810	17	100
4	Wood's Northern Dent	" 26	" 20	70	"	14	1,700	16	1,880
5	Selected Leaming	" 26	" 20	105	"	14	1,700	16	340
6	Longfellow	" 26	" 20	100	Glazed	14	600	19	1,380
7	Champion White Pearl	" 26	" 20	110	Early Milk	14	490	10	240
8	Compton's Early	" 26	" 20	79	Late Milk	12	1,630	14	50
9	Angel of Midnight	" 26	" 20	84	Glazed	12	1,190	11	1,650
10	North Dakota	" 26	" 20	92	Doughy	11	1,650	..	.....
11	White Cap Yellow Dent	" 26	" 20	102	"	10	1,120	..	.....

The average yield from the rows was 13 tons 1,660 lbs. per acre.
The average yield from the hills was 15 tons 1,668 lbs. per acre.

INDIAN CORN SOWN AT DIFFERENT DISTANCES.

Three varieties were chosen for this test: Champion White Pearl, Selected Leaming and Longfellow. The seed was sown May 26 and the corn was cut for ensilage September 20. Sixteen rows of each variety were sown; that is, four rows

at each of the distances mentioned, and the yield per acre has been calculated from the weight of crop obtained from the two inner rows in each case. The length of the portions of the rows cut for weighing was sixty-six feet.

Name of Variety.	Date of Sowing.	Date of Cutting.	Average Height.	Condition when cut.	Weight per acre grown in rows.		Distance between the rows.
			Inches.		Tons.	Lbs.	Inches.
Champion White Pearl	May 26	Sept. 20	84	Early Milk	15	1,563	21
" "	" 26	" 20	96	"	15	315	28
" "	" 26	" 20	110	"	14	490	35
" "	" 26	" 20	105	"	15	1,678	42
Selected Leaming	" 26	" 20	77	"	14	1,673	21
" "	" 26	" 20	86	"	14	628	28
" "	" 26	" 20	105	"	14	1,700	35
" "	" 26	" 20	107	"	14	670	42
Longfellow	" 26	" 20	83	Glazed	14	728	21
"	" 26	" 20	89	"	13	508	28
"	" 26	" 20	100	"	14	600	35
"	" 26	" 20	94	"	13	978	42

REPORT OF THE DOMINION CHEMIST

FRANK T. SHUTT, M.A., F.I.C., F.R.S.C.

OTTAWA, March 31, 1912

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa, Ont.

SIR,—I have the honour to submit herewith the twenty-fifth Annual Report of the Chemical Division of the Experimental Farms.

The recent decision to materially reduce the size of the Annual Report of the Experimental Farms has rendered it impossible to discuss, even briefly, all the investigations that have been carried on during the past year. It has been necessary, therefore, to confine ourselves in this report to an account of certain phases of the work, and, in so doing, we have thought it well to select only those investigations and matters which appear to be of general and wide interest and indicative of the scope of our labours. It is hoped that it may be possible to issue bulletins on special subjects more frequently than in the past and thus ensure a more timely and probably more acceptable presentation to our readers of the work of the Chemical Division.

In addition to carrying on research work towards the solution of those problems affecting Canadian agriculture which call for chemical investigation, we have, as heretofore, endeavoured to make the Division directly useful to the individual farmer. This latter branch of our work is largely effected through correspondence, which of late years has steadily and markedly increased. We are daily in receipt of many inquiries relating to soils, manures, fertilizers, feeding stuffs, insecticides and fungicides, etc., etc., in the answering of which a very considerable amount of information of a valuable character is disseminated through the country. In this way the Chemical Division is accomplishing, as no doubt are the other Divisions of the Experimental Farm system, a direct and important educational work.

Very frequently, samples of an agricultural nature accompany our correspondents' letters. The examination of these in many instances, is fruitful of results of general value to the farming community, indicating lines of research that would furnish information of general interest. In this matter of analysis of what may be termed farmers' samples, much discretion must be exercised. To submit to analysis all samples so received would be quite impossible, and indeed unnecessary, but, as time permits, such as warrant analytical work are examined and reported on. In this connection it may be well to point out that we cannot undertake the examination of mineral specimens, of commercial fertilizers, of materials in connection with alleged poisoning cases and those of a purely private or business character. Further, we would impress on our correspondents that there is always a large amount of analytical work on hand and an immediate report is generally impossible. As far as may be practicable, samples and correspondence are dealt with in the order received.

A classified list of the samples received during the past year, with the provinces from which they were forwarded, is presented in the following table:

SAMPLES RECEIVED FOR EXAMINATION AND REPORT FOR THE TWELVE MONTHS ENDED MARCH 31, 1912.

Sample.	British Columbia.	Alberta.	Saskatchewan.	Manitoba.	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Total.
Soils	44	496	490	463	35	44	45	6	9	1,632
Muds, mucks and marls	6	....	1	....	2	....	2	4	14	29
Manures and fertilizers	5	....	....	....	2	42	4	4	....	57
Forage plants and fodders	6	35	12	9	44	11	5	12	8	142
Waters	69	15	15	10	153	23	6	7	2	300
Miscellaneous, including dairy products, preservatives, fungicides and insecticides	12	5	16	5	150	27	2	9	5	231
	142	551	534	487	386	147	64	42	38	2,391

The investigations reported on in the following pages may now be outlined. It will be found that they refer to matters of very considerable interest to those who practise general farming as well as to those engaged in the more specialized branches of agriculture.

The Nitrogen-Enrichment of Soils.—This subject is, we believe, one of fundamental importance and, as such, merits the attention of every intelligent farmer. The up-keep of the nitrogen-holding material in the soil is probably the chief factor in maintaining its fertility. The application of farm manures and the growing of legumes as in a rotation, constitute the principal means towards that end and must, therefore, find a place in all systems of rational and successful farming.

The value of the legumes (of which clover is a prominent member) as manurial agents has been determined by us in many ways during the past twenty years, by their analysis, by noting the increase in yields in crops succeeding their growth and by the repeated analyses of soil bearing continuously clover or other legume. It is this latter phase of the question that we here report on. The plot devoted to this experiment is of a light, sandy character, too poor at the outset to be profitably farmed. During the 10 years of the investigation, this soil gained, simply from the growth of clover, on an average, 50 pounds of nitrogen per annum, or, put otherwise, had doubled its nitrogen-content. The value of these data, obtained under what must be considered as unfavourable or disadvantageous conditions, will be obvious. The inevitable losses in humus and nitrogen, consequent upon the necessary cultivation of the soil when growing crops other than those which put the land in sod, are also discussed, with a view of emphasizing the necessity for the adoption of a rotation which includes the periodic growth of clovers and grasses.

Fodders and Feeding Stuffs.—This chapter discusses the composition of a number of feeding materials examined during the past year. These include (1) a series of barleys grown in Alberta, the analyses indicating a high nutritive value; (2) a series of three varieties of Broom corn (*Sorghum vulgare*) grown at Ottawa and cut at two stages of growth, the data pointing to a fodder distinctly inferior to that furnished by Indian corn, but one that as a by-product in the growth of material for broom-making may be taken advantage of for stock feeding; (3) a series of ensilages from clover, Indian corn and the Wagner Wood pea (*Lathyrus sylvestris Wagneri*); (4) Upland Prairie hays from Alberta, hays from rushes and sedges from a reclaimed dyke in Nova Scotia and a hay from Saskatchewan cut from an 'alkali flat' and

consisting essentially of Drop Seed grass (*Sporobolus depauperatus*): and (5) a number of miscellaneous feeding stuffs including meals and milling by-products of various kinds, sent in for examination. In this chapter there will be found much of interest and value to the stock-raiser and dairyman.

The Influence of Heredity in Mangels.—The results of the twelfth year of this investigation are here reported. The Gate Post and the Giant Yellow Globe are the varieties under observation and the data furnish satisfactory proof of the superiority of the former. Each season without exception, the Gate Post has been the richer in dry matter and sugar. This investigation emphasizes that heredity in mangels markedly influences composition, and that the value of farm roots should be determined not only by their yield per acre and keeping properties, but also by their composition, which, to some extent, as we have proved, will depend on the variety.

Sugar Beets for Factory Purposes.—This is a continuation of the work commenced many years ago to determine the relative richness and purity of leading varieties of sugar beets as grown in various parts of the Dominion. From the larger number of points, roots of excellent quality were obtained, indicating that beets suitable for factory purposes can be grown in widely distant districts throughout Canada.

Insecticides and Fungicides.—This chapter will be more particularly of interest to fruit-growers. It includes a fairly complete discussion of commercial brands of Arsenate of Lead and Lime-sulphur Washes, their composition and value. The nature of Phytonal, a newly introduced insecticide manufactured in Germany, is also given. In conclusion, recommendations for the branding of insecticides and fungicides upon the market are suggested, the adoption of which, it is believed, would prove of value both to the user and to the manufacturer of these spraying materials.

The Fertilizing Value of Rain and Snow.—The nitrogen compounds present in the rain and snow as falling at Ottawa have been determined since 1906. For the year ending February 29th, 1912, the rain furnished 5,075 lbs. and the snow 1,025 lbs. per acre. This investigation is being made in concert with agricultural chemists in many parts of the world with a view of determining the value of the rain and snow as suppliers of nitrogenous plant food and of ascertaining the differences that may exist in the atmosphere in various countries, in respect to richness in nitrogen compounds.

The Water-Supply of Farm Homesteads.—The practical value of this branch of our work becomes more and more evident, and we can record an ever-increasing interest shown by the farming community in the purity of their water supplies. The results of each sample analysed are fully discussed in the reports sent to those forwarding the waters, but, for the sake of brevity, the purity or otherwise is merely stated in this report. The data are placed on record for the purposes of reference and to furnish the facts upon which the opinion as to the character of the water is based.

As already remarked, this report contains but a part of the work undertaken during the past year. It may be desirable, therefore, in conclusion, to outline some of the more important investigations not here recorded, the publication of which is, for the time deferred. Some of these are still in progress and others await an opportunity for collating and considering the data. ,

Canadian Soils.—Among the more important series of soils examined in the past are the following:

1. A series of soils and sub-soils representative of an area of, say, 2,000,000 acres on the Lower Saskatchewan River (The Pas). The results of our examination indicate that the area involved possesses very considerable agricultural possibilities.

There were many types of soil, ranging from heavy, plastic clays to loose, open sands with some examples essentially peaty in character. There were a few soils that might be termed calcareous. Evidence of alluvial origin was most marked in a number of cases. The necessity of thorough drainage for the improvement of many of these soils was noted. A preliminary report on this series has been written, but work on further samples may be necessary before the data are sufficiently complete for publication.

2. A series of soils from a district on the South West Miramichi River, New Brunswick, examined for the purpose of ascertaining whether the area involved were suitable for agriculture. There were in all forty samples. A very considerable proportion of these were coarse-grained sands and gravels and of decidedly inferior quality. In our report, which was of a tentative character, the view was expressed that the area was better suited to forestry than to agriculture.

3. A small number of Nova Scotian soils typical of well-defined geological areas. The examination, both chemical and physical, of these soils has been very fairly complete and in our report, now in the hands of the Secretary of Agriculture for Nova Scotia, the data are very fully considered. It is hoped to continue this work until we have on record data from all the more important areas or districts of the province.

4. Soils from virgin or unoccupied areas in various parts of Manitoba, Saskatchewan, Alberta, British Columbia. The analysis of many of these is as yet incomplete and, in consequence not ready for publication. It may be stated, however, that the work already accomplished has added much to our knowledge of the soils of these provinces and has enabled us to advise more intelligently those settled, or about to settle, upon these lands.

Conservation of Soil Moisture.—In districts of sparse rainfall, as in certain parts of Northwestern Canada, in which, unless there be provision for irrigation, the so-called 'dry farming' methods are practised, the question of the absorption and retention of moisture by the soil is all-important. The principles of moisture conservation are fairly well understood, but there are yet many features in the economical working of the soil to be satisfactorily settled. The value of sub-soiling, the depth and time of ploughing, the frequency, nature and depth of surface cultivation, the value and kind of sub-surface packing, are all points requiring investigation, both on heavy and on light loams. Isolated experiments with a view of obtaining information on cultural methods as affecting soil moisture have been made by us for some years past, but in the autumn of 1910, a more exhaustive and continuous series of experiments to be carried on at certain of the Western Experimental Farms, was planned, in connection with a series of plots set out by the Agricultural Division and from which data on the yields of grain, etc., would be obtained. By periodic determinations of the moisture of these plots, not only would the value of the various cultural treatments of the soil as regards moisture conservation be learned, but it would be possible to correlate the results with field returns. One season's results have been obtained, but it is proposed to defer their publication until the close of the various rotations under which the lands have been put and which are now running their course. Further, to eliminate seasonal variations and to ascertain the effect of different rotations, this work must be continued for a number of years before any final pronouncement can be made. The determinations in the Laboratory are being made monthly, on samples taken to several depths, from the surface to 18 inches and from 18 inches to 5 feet. This work entails the examination of several hundred samples per month during the spring, summer and autumn seasons.

The season of 1911 was, at several points of experiment, unfavourable to the objects of this research, but, nevertheless, the data show that the moisture content of soils may be distinctly modified by the nature of the cultural methods employed

and further confirm the value of surface cultivation as a means of conserving moisture for crop use.

The Composition of Wheat and Barley as Influenced by Soil and Climatic Conditions.—This research, begun several years ago, has been continued during 1911 by growing wheat of the same stock on twelve of the Experimental Farms and Stations and comparing the composition of the harvested grain with that of the parent seed. Moisture determinations have also been made on the soils growing the grain, periodically from seed time to harvest. Unfortunately, there was unfavourable weather during the latter part of the growing season and during the harvest at a number of the Western Farms; in no less than five cases was the grain more or less frosted. In such cases, of course, the results could not be used for the purposes of this investigation, but testimony was secured which confirms our conclusion from previous work that a rapid development and maturation of the seed tends to produce a grain of high protein content and excellent milling quality.

The Wholesomeness of Frozen Roots.—This experiment was undertaken to ascertain the correctness of certain statements appearing in the press to the effect that frozen roots were poisonous to stock and that the feeding of such frequently gave rise to fatal results. In a trial lasting four weeks, five pens of five pigs each were under observation, frozen mangels and mangels that had been repeatedly frozen and thawed being fed with an equal weight of a good meal mixture. While in certain of the pens the pigs made little or no gain, no impairment of health was observed. The publication of the data is deferred until the completion of the analytical work on the mangels, now in progress.

Meat Inspection Division, Health of Animals Branch, Department of Agriculture.—This work, now in its fifth year, involves the chemical and microscopical examination of various samples collected by the Government Meat Inspectors at the various packing houses in the Dominion. For the year ending March 31, 1912, we analysed and reported on 86 samples, the classification of which is as follows:—

	Samples.
Lard, beef fat and tallow	4
Dye stuffs and colouring matters	31
Preservatives and pickling solutions	25
Spices and condiments	16
Preserved meats	1
Fillers for sausages	2
Jams and catsups	2
Tomato pulp	1
Miscellaneous	4
	86

For the conduct of this work, which necessarily requires special skill and attention, it has been found necessary to detail one member of the chemical staff, whose time is almost entirely occupied in its accomplishment.

In concluding this letter of transmittal, I beg to tender my sincere and hearty thanks to the members of the chemical staff, who have rendered valuable assistance in the various researches undertaken by this Division. Mr. A. T. Charron, M.A., in addition to his duties of First Assistant Chemist, has done most useful work by delivering several courses of lectures in French on agricultural topics.

I have the honour to be, sir,

Your obedient servant,

FRANK T. SHUTT,

Dominion Chemist.

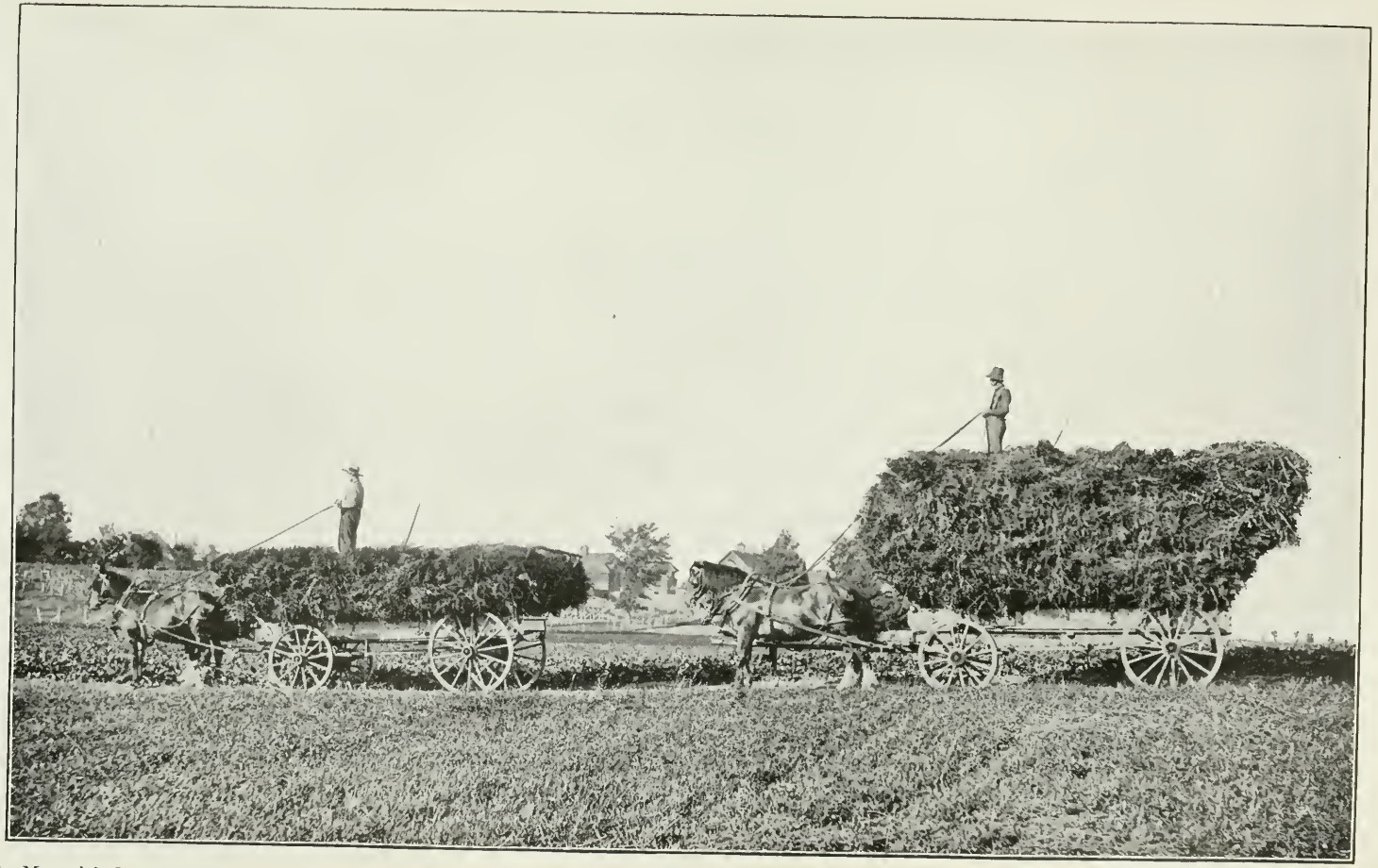
NITROGEN-ENRICHMENT OF SOILS.

CLOVER AS A MANURIAL AGENT.

Our observations, extending over many years and with many types of soil, have convinced us that the up-keep and increase of fertility is largely dependent on the up-keep and increase of the nitrogen-holding, humus-forming material—material such as is furnished by farm manures and the growth and turning under of green crops (or their residues) in general but more especially of those commonly known as the legumes. The important rôle of humus as a constituent of arable soils, in improving texture, increasing the soil's retentive power for moisture, in furnishing, by its decay, plant food in available forms and in supporting the bacterial life of the soil, has been repeatedly emphasized in the publications of this Division. It has also been pointed out that nitrogen may be considered the dominant plant food constituent, the one above all others that determines a soil's productiveness—that humus is its natural storehouse in the soil and that, with the inevitable destruction of humus through cultural operations, nitrogen is dissipated.

These views naturally led us to inaugurate experiments to measure the losses and gains in soil nitrogen under various systems of farming, as well as to ascertain the extent to which nitrogen enrichment could be effected through the growth of legumes. It is one of these latter experiments, having now been in progress for ten years, that may here be reported on. It was instituted to determine by direct analysis of the soil the amount of nitrogen that might become part and parcel of it through the continuous growth of clover, it being decided that the soil at the outset should be a very poor one.

The plot set apart for this work was, in the early spring of 1902, dug out to a depth of 8 inches and the excavation filled in with a well-mixed, light, sandy loam. The soil throughout the plot was by this means made uniform in character. It was, purposely, very poor in humus and nitrogen, so that the results might show the extent to which nitrogen-enrichment could be carried on under what might be termed unfavourable conditions—a soil of this character drying out rapidly in times of drought and clover being a moisture-loving crop. The subsoil was sand. At the outset, the plot was dressed with superphosphate at the rate of 400 lbs. and muriate of potash at the rate of 200 lbs. per acre. No nitrogen was given, but the soil was watered with a solution of 'Nitragin'—a culture for Red Clover received from Germany. Lime at the rate of one ton per acre was worked into the soil in the spring of 1909, as the plot was then showing signs of sourness. The first seeding (Red Clover) was made in the early spring of 1902 and a very fair catch obtained. The plot has been in clover continuously since that date, so that we can now record the results of 10 years' work in this investigation. The crop was cut as occasion seemed to require throughout the season, not permitting the plants to go to seed, and the material was allowed to decay on the soil. Every second year, the plot was dug over and resown. From time to time, the soil of this plot has been sampled and its nitrogen-content determined. The results are tabulated as follows:



The Manurial Value of Clover.—The wagons contain yields of oats from adjoiuing plots of uniform size; that to the left is the crop after grass yield, 36 bush., 13 lbs. per acre; that to the right is the crop after grass mixture containing clover, yield, 46 bush., 4 lbs. per acre.

NITROGEN-ENRICHMENT OF SOIL DUE TO THE GROWTH OF CLOVER.

—	Date of Collection.	Nitrogen.	
		Percentage in Water-free Soil.	Pounds per Acre to a depth of 4 inches.
Before experiment	13-5-02	·0437	533
After two years	14-5-04	·0580	708
" four years	15-5-06	·0608	742
" five years	30-5-07	·0689	841
" six years	23-5-08	·0744	908
" seven years	4-5-09	·0750	915
" nine years	5-5-11	·0824	1,005
" ten years	22-5-12	·0856	1,044
Increase in nitrogen due to ten years' growth	.....	·0419	511

The increase in organic nitrogen during the period is thus seen to be approximately 500 lbs., or 50 lbs. per annum per acre. This is the first four inches of soil. The increase though continuous, has not been regular. This irregularity was undoubtedly due to the growth of the crop and the dissipation of the residues, with their nitrogen, being unequally affected by the season. Moderately cool and damp weather very materially favoured the clover on this light soil, while a season characterized by high temperatures and long periods without rain meant but little growth after the first cutting. The decomposition of the residues and the dissipation of the nitrogen, due to bacterial activity and other causes, would also no doubt be markedly influenced by seasonal differences, being greatest during those summers that were hot and moist.

Many analyses of the clover crop have been made by this Division in connection with this nitrogen-enrichment investigation and the data show that the annual addition of nitrogen from this source in roots, stems and leaves, may vary, according to the season, character of soil, the presence of nitrogen-fixing bacteria, etc., from 75 to 150 lbs. per asre. If we assume that, in this plot, the growth of the clover annually added nitrogen at the rate of 100 lbs. per acre, then half of this amount owing to oxidation, etc., was lost and the net gain was but 50 per cent of the initial enrichment. Cultivation of the soil involves a certain depletion of its nitrogen; this is inevitable, but, unquestionably, the loss from this cause is greater in light, open soils than in heavy, plastic loams. Our tests conducted at the Experimental Farm, Indian Head, Saskatchewan—a heavy clay soil—however, showed that during a period of 22 years, in which the land was alternately in grain and in fallow, the loss in nitrogen due to cultivation of the soil (including frequent fallowings) more than doubled the amount taken away in the harvested grain. This loss must be made good if productiveness is to be maintained and the only practical methods for the farmer to do this are by the application of farm manures (which of course implies the keeping of stock) and the adoption of a rotation in which, periodically, the soil shall bear a humus and a nitrogen-rich crop—in other words, a forage crop, such as hay or pasture, containing one of the clovers, alfalfa or other member of the legumes.

Of all farm crops, the legumes only can appropriate the free nitrogen of the air and add it to the soil. The property gives them a unique place in any system of cropping. They are, above all others, soil-restorers and their growth, in addition to furnishing most valuable fodder, leaves the soil richer and more productive than before. Farm manures are, and must always remain, the mainstay of the farmer in

enriching his land, but there are few farms indeed on which a sufficient amount is produced to maintain the soil in its best condition, much less to increase its productiveness. He must, therefore, have recourse to the legumes, which, as our experiments in the laboratory and field have shown, may, in a single season, enrich the soil with as much nitrogen as would be supplied by an application of ten tons of ordinary farm manure. If the clover or alfalfa is cut and removed, there still remains in the roots from a good crop a very considerable amount of nitrogen, which, subsequently, is set free in forms suitable for the nutrition of other farm crops. Thus in any case, whether the whole crop is turned under or hay is made, the soil is the richer for its growth, richer chiefly for its added nitrogen, but also for the humus-forming material it has supplied—material that plays so important a part in improving a soil, from every point of view, in making it rich, mellow, retentive of moisture and a suitable habitat for those micro-organisms whose function it is to prepare food and present it in assimilable forms for our farm crops.

FODDERS AND FEEDING STUFFS.

In this chapter we present data from the analysis of a number of fodders and feeding stuffs examined in the Farm laboratories during the past year. These include a series of barleys grown on irrigated and on non-irrigated lands at Strathmore, Alta.; several varieties of Broom corn grown at Ottawa; ensilages from Indian corn, clover and Wood pea; hays from the prairies in Alberta and reclaimed dykes of Nova Scotia, together with several materials, chiefly by-products, not upon the market, and hence not within the jurisdiction of the Inland Revenue Department, and respecting which further information was sought. To these are added a number of feeds purchased for experimental work in feeding at the Central Farm.

BARLEY.

This is an interesting series, comprising Chevalier, New Zealand and Hannchen—well-known two-row varieties—grown on the C. P. R. Demonstration Farm, Strathmore, Alta. Plots of each variety were sown on spring-irrigated, fall-irrigated and non-irrigated land, in order to obtain further knowledge respecting the influence of the soil moisture content on the composition of the grain. This feature of the investigation will be discussed more fully later and in another place; it may suffice here to consider the data briefly from the general standpoint of the composition of Albertan-grown barley.

Analyses of Barleys.

Laboratory No.	Variety.	Moisture.	Protein.	Fat or Oil.	Carbohydrates.	Fibre.	Ash.
		p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
9043	Chevalier, parent seed	10·21	10·75	1·87	72·78	2·36	2·03
10977	" non-irrigated	7·62	11·28	2·50	70·65	5·25	2·70
10978	" spring-irrigated	8·00	11·71	2·52	69·78	5·22	2·77
10979	" fall-irrigated	7·81	11·44	2·53	70·49	5·09	2·73
9044	New Zealand, parent seed	9·32	10·75	1·68	72·74	2·85	2·66
10974	" non-irrigated	8·52	13·60	2·21	67·38	5·51	2·78
10975	" spring-irrigated	8·07	13·50	2·52	67·92	5·20	2·79
10976	" fall-irrigated	7·87	13·72	2·44	67·78	5·32	2·87
9045	Hannchen, parent seed	9·46	9·63	2·60	71·52	4·09	2·70
10971	" non-irrigated	7·16	13·64	2·14	70·64	3·85	2·57
10972	" spring-irrigated	8·34	13·06	2·19	69·76	4·05	2·60
10973	" fall-irrigated	8·02	12·78	2·14	70·45	3·96	2·65

The parent seed in the case of the Chevalier and New Zealand was obtained from the Gallatin Valley, Montana, U.S.A., that of the Hannchen was grown in Ontario.

The season was not favourable to the special object of the investigation, being one of unusually heavy rainfall, which no doubt tended to minimize, throughout the growing period, the difference in moisture content of the various plots. In consequence of this, we find the protein-content was practically the same for the grain of any one variety from all three plots non-irrigated, spring-irrigated, and previous fall irrigated. The work, however, has brought out very plainly that there had been a very considerable increase in the protein-content of the barley by its growth in Alberta. This was true in all three varieties, but more marked in New Zealand and Hannchen than in Chevalier.

Our work respecting the influence of environment on the composition of wheat, an investigation carried on for the past seven years, has established the fact that the protein-content of this cereal may be profoundly modified by such factors as soil moisture and temperature during the filling out and maturation of the kernel. It has been found, for instance, that the climatic influences commonly prevailing in the Northwestern provinces during this period in the life of the wheat plant induce a high protein (gluten) content. This is evidently also true for barley and we may, I believe, safely conclude that this cereal—probably the most generally useful for stock feeding of all the grains—will, as grown generally in the Northwest, be found of especially high value as a feeding stuff.

For the purposes of comparison with the foregoing data, we may insert the average composition of 20 samples of Ontario-grown barley, examined by us some years ago.

	Per Cent.
Moisture	11·96
Protein	10·57
Fat or Oil	2·06
Carbohydrates	68·90
Fibre	4·10
Ash	2·41
	100·00

The superiority, for feeding purposes, of the western-grown barley is shown more especially by its higher protein content, but also, to some extent, by its larger percentage of fat and smaller proportion of water.

BROOM CORN.

Several varieties of Broom corn (*Sorghum vulgare*) have been under investigation during the past season (1911) by the Division of Botany, with the view of determining their value for broom manufacture. The opportunity was seized to ascertain the composition of this crop as grown at Ottawa, samples being kindly supplied for analysis by Mr. H. T. Güssow, Dominion Botanist, from the plantation under his care on the Central Experimental Farm. The varieties were Improved Evergreen, Early Japanese and California Golden, and each was examined at two stages of growth, in flower and when the seed was in the 'dough.' At this latter stage it was supposed the crop would be in a suitable condition to cut for broom material. For the purposes of comparison, the average composition of Indian corn at similar stages of growth, is given, the figures being obtained from averages made in 1900 of seven varieties grown on the Central Farm. The data for the broom corn in the following table are for the plant minus the 'brush'—the part used in broom manufacture.

COMPOSITION OF BROOM CORN.

Laboratory No.	Designation.	Water.	Crude Protein.	Ether Extract (crude fat.)	Carbohydrates.	Fibre.	Ash.
		p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
10117	Improved Evergreen, in flower	69·99	1·80	·55	15·70	10·58	1·38
10118	" " , in dough	68·48	1·27	·52	15·05	12·96	1·72
10128	Early Japanese, in flower	71·37	1·50	·49	14.70	10·67	1·27
10129	" " , in dough	68·42	1·25	·53	15·75	12·69	1·36
10158	California Golden, in flower	71·19	1·42	·48	14·70	11·09	1·12
10159	" " , in dough	69·93	1·23	·50	15 60	11·57	1·17
	Indian Corn, Silking	80·76	1·76	·21	10·70	5·19	1·38
	" " , in dough	77·25	1·88	·33	13·10	6·23	1·21

Authorities are practically unanimous that the sorghums—the class of plant to which broom-corn belongs—are distinctly inferior as forage to Indian corn. As they are better able to withstand hot and dry weather than is Indian corn, it is possible that they may find a useful place in the agriculture of so-called 'dry farming' sections, but, in districts favourable to Indian corn, there can be no object in growing them for fodder. From the fact that they very quickly become hard and fibrous once the seed has begun to form, the crop must be cut while still quite young, either for 'soiling' purposes or for curing. As it approaches maturity, the plant loses its succulency and becomes less and less palatable and nutritious.

The present analysis bear out this view, for it will be observed from a study of the data that, even while still green and immature, the percentage of fibre is very high, practically twice that in Indian corn of the same age.

Further, calculated to the same water-content, Indian corn contains considerably more protein—the most valuable of the nutrients from a feeding standpoint. As the broom corn matures, it not only becomes less palatable and less digestible, but less nutritious from the decrease in its protein content.

The best results, judging from the protein content, were obtained from the Improved Evergreen cut early, but the deductions from the series as a whole, point to the necessity of cutting as soon as the plant heads out, if the crop is to be fed green and a palatable, nutritious fodder obtained.

As a by-product in the growth of material for the manufacture of brooms, it may be used, we think, to advantage in feeding, but, grown as a forage crop, our results do not indicate that it would be profitable.

ENSILAGE.

The ensilage here reported upon comprise one from Indian corn and one from 'Wood Pea' sent from L'Institut Agricole d'Oka, La Trappe, Quebec, and a sample of corn and one of clover ensilage from the Experimental Farm at Agassiz, B.C. One or two analyses from our own records are added for comparison.

COMPOSITION OF CORN, WOOD PEA AND CLOVER ENSILAGE.

Laboratory No.	Designation.	Water.	Crude Protein.	Crude Fat.	Carbohydrates.	Fibre.	Ash.
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
11010	Corn Ensilage	80·41	1·62	·28	10·44	6·15	1·10
11286	" "	80·49	1·87	·50	9.83	6·01	1·30
	" " (average)	79·10	1·70	·80	11·00	6·00	1·40
11011	Wood Pea Ensilage	51·82	8·23	1·73	19 20	15·18	3·84
11081	Clover Ensilage	63·17	4 01	1·42	12·67	15·78	2·95
	" " (average)	79·10	1 70	·80	11·00	6.00	1·40

Corn Ensilage No. 11010 (Institut Agricole d'Oka). This was from Selected Leaming sown June 20th and harvested October 10th, at which latter date the corn ears were quite immature and the fodder 'watery.' It had been slightly touched with frost a few days previous to cutting. The yield was 12 tons per acre.

In spite of the fact that the corn had not reached the 'glazing stage,' the condition which analysis and experience have shown to be the best for ensiling this crop, and the further disadvantage of being slightly frozen when harvested, the data show that the ensilage was of fair, average quality. Better quality of corn ensilage has come under our notice, but the analytical figures, coupled with the fact that the material was not excessively acid, satisfactorily indicate that ensilage of good feeding quality may be made even in districts considered unfavourable, or at all events, not well suited to the growth of corn.

Wood-pea ensilage No. 11011 (Institut Agricole d'Oka). This was made from the second cutting, the first yielding between 2 and 2½ tons of hay per acre.

The comparative dryness of this ensilage is to be accounted for, we think, by the fact that the second growth was stunted by drought and this would also explain the high percentage of fibre present.

Compared with corn ensilage on the same basis as regards dry matter and considering chiefly their percentages of protein, it may be concluded that the wood pea ensilage has approximately twice the feeding value of average corn ensilage, weight for weight, and this deduction is supported by the fact that the proportion of the crude protein present as true albuminoids is about the same in both ensilages. The comparatively high fibre-content in this ensilage is certainly a disadvantageous feature; it would no doubt be less in ensilage made from the first cutting.

Difficulty is often experienced in procuring good ensilage from the legumes, (of which the wood pea is a member) no doubt owing to their high nitrogen-content, but the present results confirm our previous experiments with ensiled clover in establishing the fact that, when the crop is not too watery and the proper precautions are taken to exclude access of air when put into the silo, a satisfactory ensilage, not too acid and of very high feeding quality, may be secured.

Clover ensilage, No. 11081 (Experimental Farm, Agassiz, B.C.). This was made in 1910 and, consequently, was over one year and a half old when analysed. The clover, with which there was mixed a considerable amount of grass, was cut in the blossoming stage and at once put into the silo.

For ensilage it has very low water-content (63·17 per cent) and this enhances its feeding value when compared with ensilages usually met with, which contain in the neighbourhood of 80 per cent water. That it is exceptionally high in protein is clear from the data, and this will be equally apparent if the composition of this ensilage with that of average clover is compared on the water-free basis. Its somewhat

high percentage of fibre may be accounted for, possibly, by the greater destruction by the fermentative changes in the silo of the less resistible constituents, such as the carbohydrates. Judged from its analysis, this ensilage must be considered one possessing nutritive qualities in a high degree, indeed one that is exceptionally rich.

Corn ensilage, No. 11286. This, as the preceding sample, was made on the Experimental Farm at Agassiz, B.C. The corn was cut in the early milk stage.

The data do not call for any special comment; they indicate an ensilage of average quality. The results in all essential features are very close to the mean from a large number of corn ensilages made in Eastern Canada, and are, from this point, of interest to dairymen and stock feeders in British Columbia.

HAY.

The samples analysed comprise two of Upland Prairie hay from the vicinity of Lacombe, Alta., a series of four hays from Dartmouth, N.S., made from sedges, rushes and red top, but all containing a greater or less admixture of other plants, and a sample of hay chiefly *Sporobolus depauperatus*, cut from an 'alkali flat,' near Bradwell, Sask.

COMPOSITION OF HAY.

Laboratory No.	Designation.	Water.	Crude Protein.	Crude Fat.	Carbohydates.	Fibre.	Ash.
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
9046	Upland Prairie	9·96	4·50	2·44	45·95	30·00	7·15
9047	"	8·13	7·00	2·88	49·38	27·20	5·41
8863	*Spartina glabra*	5·75	6·69	1·85	46·54	30·80	8·37
8864	*Scirpus americanus*	11·75	6·94	2·05	44·28	28·81	6·17
8865	*Juncus balticus*	11·80	8·17	2·43	44·89	28·07	3·64
8866	*Agrostis alba*	11 05	6·58	2·29	46·96	26·30	6 82
8632	*Sporobolus depauperatus*	3·33	4·25	1·62	52·85	31·85	6·10

Upland Prairie Hay, No. 9046. This was cut late and after frost and rain.

Upland Prairie Hay, No. 9047. This was of the same character, but had been cut early and cured without rain. The first was selling at $8 per ton, the second at $15 per ton.

The analysis established the superiority of No. 9047, and furnished additional proof of the wisdom of early cutting and good curing. In crude protein it is much the richer. In composition, as no doubt in palatibility and digestibility, No. 9046 has suffered much and there is a strong probability that the great difference in price between the hays would be found, by actual feeding, to be no greater than that between their nutritive values.

Hays from a reclaimed Sandy Dyke—

No. 8863. *Spartina glabra,* Salt Marsh grass.

No. 8864. *Scirpus americanus.* A sedge.

No. 8865. *Juncus balticus.* A rush.

No. 8866. *Agrostis alba.* Red top grass.

As already mentioned, these were not pure but contained other plants, the bulk of the hay, however, was as indicated above.

Both sedges and rushes are usually considered unpalatable and poor feed, with a low protein-content and high fibre. In so far, however, as the chemical composition may be taken as a guide to nutritive qualities, the samples in this series makes a very satisfactory showing. Particularly favourable data were obtained for *Juncus balticus* (No. 8865), which ranks highest in the series as regards protein. In this connection, it will be of interest to make the following quotation from the Cyclopædia of Agriculture (Bailey) in which, speaking of wild grasses, the writer says 'In some of the Mountain parks (Rockies) an excellent quality of wild grass is secured. In one of these (South Park, Colo.) a species of rush, *Juncus balticus*, is extensively cut for hay and this hay on the Denver market outranks timothy as a feed for horses.'

Superiority in feeding value is indicated by high protein and low fibre and this allows a certain comparison to be made between the hays of this series as well as between them and others, the composition of which is on record. It must, however, at the same time be borne in mind that the palatability and digestibility—qualities not indicated by the data of composition—are of the greatest importance and that they are qualities very profoundly affected by the stage of growth at which the grass has been cut and by the weather conditions during curing. Deterioration very rapidly takes place as regards digestibility once the seed is mature, and alternate wetting and drying during the process of curing make a hay much inferior to one that is quickly dried and at once stacked or housed. For these reasons, and, in part, to account for the good quality of the sedge and rush hays, I append the following information regarding them as furnished by our correspondent. It should prove of considerable interest to Maritime farmers having access to marshes from which they can cut feed. He writes:—

'I selected these samples as typical of the best hay we had, that is, it was cut early (when the seed was in the dough stage) and was well cured. *Spartina glabra* is ready to cut about the middle of July. *Scirpus americanus* is later and ready the first of August. *Juncus balticus* is very early; it is in its prime about the first of July. *Agrostis alba* (Red top) is usually at its best about the middle of July. The land is a sandy dyke reclaimed from the sea.'

In answer to our enquiry regarding palatability, he states 'We are feeding them right along to stock and obtain very satisfactory results. With the exception of the rush (*Juncus balticus*) cattle prefer these hays to timothy. I do not, however, think they can be quite as nutritious as timothy.'

Hay from an 'Alkali flat,' Sporobolus depauperatus, Laby. No. 8682.—This was forwarded by a correspondent at Bradwell, Sask., who writes 'Until this year, we have never cut this grass, as we thought it of little value. The drought last year (1910) made it necessary to supplement the supply of feed and we cut this grass, of which we have 70 acres.

From these results, I judge it to be of rather low feeding value and distinctly inferior to well-cured upland prairie hays, compared with which it contains less protein and more fibre. Possibly if cut when quite young, the hay might be more nutritious.

Respecting the palatability of this hay, our correspondent says 'Horses will eat it when stabled but leave it for wheat or oat straw stacks if running loose. As pasture, both horses and cattle refuse it until the upland prairie is bare. Steers and dry cattle do pretty well on it, but it is not desirable for dairy cows, the milk yield drops. It seems to cure naturally and well and is little injured, if any, by fall frosts. Apparently horses at large prefer this to brome in winter, for they will more readily uncover it when both are under equally deep snow.'

MISCELLANEOUS FEEDING STUFFS.

Alfalfa grains, Laby. No. 11559.—This purports to be a mixture of ground alfalfa and dried brewers' grains and the claim is made for it that it is 'equal in milk-producing power to twice its weight of bran, though sold at the same price.' Our correspondent states that his cows do not like it and will eat bran in preference.

In appearance it is similar to ground hay, though closer inspection reveals the presence of hulls, presumably of barley. It is of a yellow-green colour and has the characteristic odor of alfalfa hay.

While containing more crude protein and being somewhat richer in fat than bran, this feed is very considerably higher in fibre. The fibrous nature of this feed, together with the fact that the nutritive value of the crude protein in alfalfa hay is not equal to that in bran, make it extremely doubtful if this mixture has feeding properties greater than those of bran. Its exact value as a milk producer could, of course, only be ascertained by actual test.

The following data allow a comparison, from the standpoint of composition, of the feeding stuffs here discussed.

COMPOSITION OF 'ALFALFA GRAINS.'

—	Water.	Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.
	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
Alfalfa Grains	7·59	17·59	4·92	47·02	18·38	4·54
Alfalfa Hay	8·4	14·3	2·2	42·7	25·0	7·4
Dried Brewers' Grains	8·2	19·9	5·6	51·7	11·0	3·6
Bran	11·1	14·5	4·4	54·2	10·1	5·7

Germ Meal, Laby. No. 8641.—This is a product of the Western Canada Flour Mills and its analysis shows it to be a feed of very considerable merit. It has high percentages of protein and fat and is quite low in fibre. It should prove a readily digestible and nutritious feed.

Daisy Chop, Laby. No. 8638.—This material was forwarded from Strathmore, Alta. It is probably an Oat Meal Mill product and belongs to a class characterized by low percentages of protein and large amounts of fibre. By reason of the presence of a considerable amount of oat hull, their digestibility is low and, consequently, their food value small. At the prices usually asked for these feeds, their profitable use is doubtful and better results can, as a rule, be obtained from the standard concentrates, such as bran, shorts, &c.

COMPOSITION OF MISCELLANEOUS FEEDING STUFFS.

Laboratory No.	Designation.	Water.	Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
11559	Alfalfa Grains	7·59	17·59	4·92	47·02	18·38	5·54
8641	Germ Meal	5·44	25·00	10·42	51·03	3·87	4·24
8638	Daisy Chop	.....	10·44	4·73	.....	.....	.....
8640	Shorts	6·35	16·35	6·47	60·62	6·30	3·91
10808	Dutch Dairy Feed	7·10	10·74	2·59	58·19	16·27	5·11
11056	Mealine	7·95	17·69	6·10	.....	2·43	.....
11270	Oat Hulls	3·80	3·44	2·12	56·92	28·10	5·62
11057	Oat Flour	6·55	14·88	6·05	.....	4·97	.....
11058	"	8·87	13·06	2·62	.....	11·17	.....
11206	Flax Seed Chaff	6·93	13·44	6·42	43·11	32·05	8·05
11207	Green Flax Straw Shives	4·69	8·00	1·93	29·36	51·85	4·17
11208	Dew-rotted Flax Straw Shives	4·30	3·44	1·29	29·08	59·30	2·59
9794	Cottonseed Meal	6·93	35·12	9·66	32·39	9·70	6·20

Shorts, Laby. No. 8640.—From the Western Canada Flour Mills. Its analysis shows it to be an excellent sample, the data are practically identical with those obtained a few years ago when, while investigating the subject of Canadian brans and shorts, a number of genuine samples were submitted to analysis.

Dutch Dairy Feed, Laby. No. 10808.—This sample was sent from Woodward Cove, N.B., but was stated to be the product of the Robin Hood Mills, Moosejaw, Sask. Inspection shows it to contain a considerable amount of oat hulls and some unground weed seeds. Its analysis places it among the oat feeds spoken of under No. 8638, to which it is very similar in character. It must be considered a feed of low value and much inferior to bran.

Mealine, Laby. No. 11056.—This was sent from Athens, Ont., and is stated to be from the Tillson Rolled Oats Co., consisting of the fine meal sifted from the rolled oats. It is evidently a satisfactory feed of very considerable nutritive value. Its high percentage of protein and fat and low fibre all point in that direction.

Oat Hulls, Laby. No. 11270.—This was sent from Verigin, Sask., the by-product of a mill in that neighbourhood. As might be expected, it is of exceedingly low feeding value, indeed distinctly inferior to that of good oat straw. The analysis agrees with those previously made of oat hulls, the low percentage of protein being further depressed in feeding value by the presence of a large amount of indigestible fibre.

Oat Flour, Laby. Nos. 11057-8.—These were forwarded for comparison, and were the products of two oat meal mills, the names of which could not be procured. The analytical data point unmistakably to the superiority of No. 11057; it is nearly 2 per cent higher in protein and 3½ per cent richer in fat and is much lower in fibre—a feature of considerable importance in feeds of this class. No. 11058 was the more finely ground and might be taken from mere inspection as the more valuable, especially as No. 11057 showed some hulls. These two samples well illustrate the value of analysis for ground feeds of this character.

Flax Seed Chaff: Green Flax Straw Shives: Dew-retted Flax Shives: Laby. Nos. 1206-08. These were obtained from the Canadian Flax Mills, Drayton, Ont., with the view of ascertaining what feeding value, if any, they possessed.

The flax seed chaff, (No. 11206), consisted essentially of chaff, but there was also present a considerable amount of flax straw, which is of a particularly harsh and brittle nature. The analysis shows a notable amount of protein, evidently from the presence of a certain quantity of flax seed. It might, therefore, in spite of its high fibre-content, be supposed to be of some feeding value. If, by fanning or seiving, the proportion of chaff and fragments of straw could be reduced, it would rank with many feeds of recognized worth, but in its present condition, its value as a feeding material is extremely doubtful. We think that it would be found unpalatable and possibly injurious by reason of the brittle, harsh straw it contains.

The green flax straw shives and dew-retted flax straw shives are, in our opinion, quite unsuitable and worthless as feeds, not merely from their low content in protein and fat and their excessive percentages in fibre, as shown by analysis, but by reason of their very coarse and extremely harsh nature. It is of interest to note that on all counts the dew-retted is much the inferior.

Cottonseed Meal, Laby. No. 9794.—This was imported by an English firm from the West Indies. Cottonseed meals as found on the market are extremely variable and, in consequence, should only be purchased on analysis. Genuine, undecorticated meals of the highest grade contain in the neighbourhood of 40 per cent protein, while some of very inferior quality analysed by us have contained not more than 10 per

cent. The percentages of oil and fibre in the very best brands are about 13 and 16 respectively. This sample, therefore, while not conforming with the data from the highest quality meals, is nevertheless a fair sample of average grade.

THE INFLUENCE OF HEREDITY IN MANGELS.

In studying the relative feeding values of the more common types of farm roots, as determined by analysis, it was found that greater differences might exist between two varieties or strains in the same class of roots than between the classes themselves. Thus, while averages taken season by season showed that mangels, as a class, contained more 'dry matter' than carrots, the differences in this regard between many of the strains of mangels examined were frequently greater than between the aforesaid averages. It was further discovered that, arranging the varieties of any class according to their dry matter content, much the same order was obtained season by season. These results seemed to point to certain inherited qualities and that, in spite of seasonal influences on the composition of the root, the relative value for feeding purposes of any particular strain, as compared with other strains or varieties in the same class, would be maintained from year to year. To obtain further information on this interesting point, which implies the transmission of characteristics of composition in roots, two varieties of mangels—the Gate Post or Long Red and the Giant Yellow Globe, were selected in 1900, as typical of the richer and the poorer varieties respectively. These have been grown every season since that time, side by side on practically identical soil and with the same manure and culture, the harvested roots being analysed as to dry matter and sugar content. In the following tabular scheme are presented the data obtained, including those of the past season and the averages of the twelve years' results.

DRY MATTER AND SUGAR IN GATE POST AND GIANT YELLOW MANGELS.

Season of Growth.	Gate Post.				Giant Yellow Globe.			
	Average Weight of One Root.		Dry Matter.	Sugar in Juice.	Average Weight of One Root.		Dry matter.	Sugar in Juice.
	Lbs.	Oz.	Per cent.	Per cent.	Lbs.	Oz.	Per cent.	Per cent.
1900	.....		11·14	6·15	.....		8·19	2·64
1901	2	9	9·41	4·15	3	3	9 10	4·08
1902	3	2	13·90	9·39	3	9	10·24	5·24
1903	3	3	12·93	7·38	3	13	10·89	6·17
1904	2	14	12·64	7·62	2	13	9·24	5·26
1905	2	13	12·07	6·83	3	12	8·64	3·55
1906	2	2	12·90	6·59	1	8	12·73	6·45
1907	3	10	12·53	7·25	2	7	10·78	6·34
1908	1	11	12·02	4·94	2	4	10·66	4·47
1909	3	14	11·82	6·64	3	7	10·95	5·82
1910	6	8	9·59	4·26	6	13	7·80	2·74
1911	2	11	10·04	3·86	3	1	6·66	1·85
Average for 12 years	.....		11·75	6·26	.....		9·66	4·55

It will be observed that while the differences in composition between the two varieties are, from year to year, by no means constant, the Gate Post has every season proved the superior root. Taking the dry-matter content as the basis of calculation, it will be found from the average of 12 years that the Gate Post mangel is approximately 20 per cent more nutritious, weight for weight, than the Giant Yellow Globe.

or put otherwise, one ton of the former has the feeding value of 1 ton 427 lbs. of the latter. The average yields of these two varieties for twelve years (1900-1911) at Ottawa, as furnished by the Cereal Division, are Gate Post 32 tons 758 lbs., Giant Yellow Globe 32 tons 713 lbs., which goes to show that there is not much difference between these mangels as to cropping values. However, on calculation, using these averages, as to yield and composition, the superiority of the Gate Post is readily seen, for from it 7,600 lbs. per acre of dry matter would be obtained, whereas from the Giant Yellow Globe, from the same area, there would be but 6,250 lbs.

The 'dry matter' of mangels is completely digestible, or practically so, and is of very considerable value as a source of heat and energy to the animal by reason of its high sugar-content. Comparing these varieties from this standpoint of richness in sugar, it is apparent from the averages of the yearly analytical data that in the Gate Post approximately 50 per cent of the dry matter is sugar, while in the Giant Yellow Globe this percentage is 45, another indication that the Gate Post is the more nutritious variety.

SUGAR BEETS FOR FACTORY PURPOSES.

Continuing the work commenced many years ago, sugar beets of the three well known varieties—Vilmorin's Improved, Klein Wanzleben and Très Riche have been grown during the past season on the several Experimental Farms and Stations. Representative samples of the harvested beets were forwarded for analysis to the Chemical laboratory, where the sugar-content and co-efficient of purity were determined. The results with certain other data are given in the subjoined table.

SUGAR BEETS GROWN ON THE DOMINION EXPERIMENTAL FARMS, 1911.

Variety.	Locality.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of One Root.		Yield per Acre.	
				Per cent.	Lbs.	Oz.	Tons.	Lbs.
Vilmorin's Improved	Charlottetown, P. E. I.	18·36	21·24	86·4	1	11	17	848
	Nappan, N. S.	17·17	19·51	88·0	1	4	13	..
	Cap Rouge, Que.	15·66	18·89	82·9	1	9	3	1,594
	Brandon, Man.	14·02	17·00	82·5	1	15	17	600
	Indian Head, Sask.	15·08	18·17	82·9	1	2	11	1,232
	Rosthern, Sask.	14·75	18·29	80·6	..	15	24	312
	Lethbridge, Alta., (irrigated)	15·91	18·20	87·4	1	4	20	15
	" " (non-irrigated)	16·28	18·63	87·3	1	3	12	..
	Agassiz, B. C.	17·46	19·37	90·1	1	13	8	1,820
Très Riche	Charlottetown, P. E. I.	16·41	18·17	90·3	1	9	21	438
	Nappan, N. S.	18·45	21·64	85·2	1	2	20	..
	Cap Rouge, Que.	16·15	20·09	80·3	1	1	3	515
	Brandon, Man.	11·72	14·89	78·7	2	7	18	..
	Indian Head, Sask.	13·49	16·97	85·3	1	6	21	1,956
	Rosthern, Sask.	12·42	16·23	76·5	1	4	23	1,520
	Lethbridge, Alta., (irrigated)	18·70	20·09	93·0	1	4	13	920
	" " (non-irrigated)	13·22	17·63	74·9	..	15	9	1,820
	Agassiz, B. C.	17·14	22·43	76·4	1	7	7	1,972
Klein Wanzleben	Charlottetown, P. E. I.	16·91	18·64	90·7	2	4	20	1,794
	Nappan, N. S.	17·05	18·84	90·5	..	14	21	800
	Cap Rouge, Que.	16·67	21·57	77·3	1	4	4	365
	Brandon, Man.	14·76	16·20	91·1	1	11	17	..
	Indian Head, Sask.	14·86	18·91	78·6	1	8	14	248
	Rosthern, Sask.	12·62	16·09	78·3	..	13	24	1,104
	Lethbridge, Alta., (irrigated)	16·46	18·63	88·3	1	8	15	1,008
	" " (non-irrigated)	12·64	18·09	69·8	1	4	12	840
	Agassiz, B. C.	16·24	19·00	85·4	2	..	8	1,028

The seed used was imported from the house of Vilmorin et Cie, Paris, France, as has been the custom in the past for this investigation. As the distribution of seed was from the same stock, the results indicate variations in richness, etc., due to the climatic, soil, and, possibly, cultural conditions prevailing in the several localities.

With two or three exceptions, the results are exceedingly satisfactory, alike as to sugar content, purity and tonnage. Commencing in the East, all three varieties at Charlottetown, P.E.I., made an excellent record, the quality of the beets being superior to the average as supplied to sugar factories. The same may be said of the roots grown at Nappan, N.S., where, similarly, the conditions must have been most favourable to the production of a pure and rich beet.

Conditions at the Experimental Station, Cap Rouge, Quebec, were reported as somewhat unfavourable, but, notwithstanding, a very fair beet for factory purposes was grown. The excessive dryness of the season may account for the very small yield.

No results can be given for the beets grown at the Central Farm, Ottawa, owing to an unfortunate oversight which resulted in mixing the several varieties at the time of harvesting.

The beets from Brandon, Manitoba, were not this year of very good quality, though the yield was satisfactory. The season at this point might be said to be unfavourable to this crop, from the standpoint of richness and purity, as the late summer and autumn months were decidedly wet and cool-conditions decidedly against a high sugar content.

At Indian Head, Sask., the beets were of medium quality only, the latter part of the season being too wet for the proper ripening of the crop. At Rosthern in Northern Sask., likewise, the conditions were not conducive to a high sugar content, the latter months being characterized by wet and dull weather with low temperatures. The yields here, as at Indian Head, were excellent.

The data from the beets grown at Lethbridge, Alta., are somewhat difficult to interpret. It was quite dry until about July 25, when wet weather set in and continued practically to the end of the season. To what extent and in what direction these unusual conditions (for this locality) may have affected the crop it seems impossible to say precisely as the results are very irregular. Contrary to expectations, we find in two of the varieties that richer and purer beets were produced on the irrigated area than on that under dry-farming methods. In the third, there was but little difference between the roots of the two areas, either in sugar-content or purity. If, as might be supposed, the non-irrigated land was the drier, it should have given, under the circumstances, the better beets. While certain of the results indicate a good factory root, others are too low, denoting a beet unsuitable for profitable sugar extraction. The yield on the irrigated area was invariably the larger. Our work after three years' investigation does not allow of any conclusions respecting the relative richness of the beets as grown on irrigated and non-irrigated land. Thus in 1908 and 1909, sugar beets grown at this Experimental Farm on irrigated and on dry land showed no great difference, though the roots from the non-irrigated plot were slightly the richer. The yield from the irrigated plots, however, has been always the larger.

All three varieties gave excellent results at Agassiz, B.C., though in one instance the co-efficient of purity is too low.

To allow a comparison of averages from the three varieties as grown, at the several localities, since 1902, the following table has been constructed.

AVERAGE PERCENTAGE OF SUGAR IN JUICE IN SUGAR BEETS GROWN ON EXPERIMENTAL FARMS.—1902-1911.

Locality.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
Charlottetown, P.E.I.	.....	.....	....	.....	.....	.....	.....	.....	14·25	17.23
Nappan, N.S.	15 87	15·33	14·41	16·52	17·08	.....	17·53	16·74	16·43	17·56
Cap Rouge, Que.	.....	.....	.....	.....	.....	.....	.....	.....	.....	16·16
Ottawa, Ont.	16·77	15·34	16·91	12·45	14·37	15·41	16·30	14·84	16·44	.....
Brandon, Man.	....	11·36	16·62	11·09	15·50	16·99	15·82	18·83	18·40	13·50
Indian Head, Sask.	15·15	16·54	15·24	14·94	14·91	15·92	15·66	17·16	.....	14·48
Rosthern, Sask	.....	.....	.....	.....	.....	.....	.....	.....	.....	13·30
Lethbridge, Alta., (irrigated)	.....	.....	.....	.....	.....	.....	16·69	17·91	.....	17·02
" " (non-irrigated)	.....	.....	.....	.....	.....	.....	16·73	18·36	.....	14·65
Lacombe, Alta.	.....	.....	.....	.....	.....	13·34	11·21	12·77	12·69	.....
Agassiz, B.C.	.....	17·44	8·10	17·32	14·28	17·65	17·15	18·30	19·18	16·95

Though notable differences are to be observed, none of the averages is so low as to preclude the use of the beets for sugar extraction, and at five points at least very superior roots were grown. Judging from the data of this table, there can be little doubt but that beets of excellent quality may be produced in many widely separated districts throughout Canada.

INSECTICIDES AND FUNGICIDES.

ARSENATE OF LEAD.

This insecticide continues to grow in favour and in many orcharding districts in the Dominion is fast replacing Paris green, the arsenical poison that has, for so many years, held the first place for the destruction of 'biting' insects. Its chief use has been in orchards and for small fruits and it is frequently applied with Bordeaux mixture and lime-sulphur solution, with both of which fungicides it can be employed with safety and success. It has also been used effectively against the potato beetle, though apparently rather slower in its action for this purpose than Paris green.

The properties which specially commend arsenate of lead as the poisonous principle in sprays are great adhesiveness, non-corrosiveness to foliage and, when well made, the quality, after dilution, of remaining a long time in suspension. In all these three particulars, it may be regarded as superior to Paris green. Its well-marked adhesive power naturally affects favourably, lengthens in fact, the period of effectiveness of the spray. The fact that it is non-injurious to foliage renders it possible to use sprays of very considerable strength without risk of burning the leaves. The fine state of division in which the arsenate of lead exists prevents it from readily settling out of the spray and this must certainly contribute towards a uniform application of the poison on the foliage. That it can be used, as already indicated, with the two most popular fungicides, Bordeaux mixture and lime-sulphur wash, without any formation of injurious decomposition products, enlarges its field of usefulness.

Though arsenate of lead is put on the market as a dry powder, presumably for use as a 'dust' spray, its use in this form is very limited, at all events in Canada. Though less bulky than the 'paste,' the powdered arsenate is not so desirable for employment in the making of liquid spray, chiefly from the fact that it settles too rapidly. It is therefore in the paste form that it is almost universally used and many brands of practically standard strength, made by firms enjoying a reputation for first-class products, are widely advertised and may be readily obtained. There are certain difficulties in the manufacture of the commercial 'paste' which militate against the continuous turning out of a product uniform as to water-content, though the aim is to keep the

percentage of water between 40 and 50—which means that the active principle, arsenate of lead—will be between 50 and 60 per cent. The larger firms are now putting a guarantee on the label of the package, stating the percentage of arsenate of lead present in the paste, together with certain other particulars as to soluble and insoluble impurities, and this is a very desirable practice for all manufacturers to adopt. In our analyses of this article during the past two years, we have seldom met with a sample of paste containing less than 50 per cent arsenate of lead. Very few, also contain more than traces of soluble arsenic, an important matter, looking to the harmlessness of the spray to foliage. There is, at present, no accepted or legal standard for arsenate of lead paste, but, reviewing the field in the light of our analyses and those made at the Agricultural College, Guelph, and by the Department of Agriculture, Washington, D.C., we believe that the following requirements would be satisfactory and readily conformed to by manufacturers.

That any arsenate of lead paste to be accounted genuine shall contain at least 50 per cent arsenate of lead; that the arsenic oxide in such combination shall not be less than 12·5 per cent; that the water-soluble forms of arsenic should not exceed one per cent calculated as arsenic oxide, and that there should be no admixture with foreign materials to reduce or affect its strength.

This 'standard' is of course, merely suggested, pending the establishment of one by the Inland Revenue Department, the branch of the Government service which has jurisdiction in such matters and which is at present considering the question. It is, however, a standard which we believe will safeguard the interests of those using this insecticide and one that can be worked to by manufacturers, whether the 'neutral' or so called 'acid' arsenate is made.

From the concluding words of the preceding sentence it will be inferred that two arsenates of lead—the 'neutral' and the 'acid'—are upon the market, and such is the case, though some pastes contain both forms. These two arsenates, differing slightly in their composition, result according to the use of acetate of lead or nitrate of lead to precipitate the arsenic in the process of manufacture of the paste. As considerable controversey has arisen in certain quarters regarding the relative merits of these two forms, the chief points at issue may be briefly discussed.

First, we have been unable to obtain any reliable evidence that the 'neutral' is more adhesive than the 'acid' form, though there is an impression among certain orchardists that such is the case. Experiments to test this point, carried out by the United States Department of Agriculture, have not, to date, indicated any great difference in this respect.

Secondly, while there is some evidence to show that the 'acid' arsenate is somewhat the more toxic, and, therefore, presumably the more valuable as an insecticidal agent, we cannot learn that this has been satisfactorily and finally established.

Thirdly, the claim is made that the 'acid' arsenate is superior to the 'neutral' as regards remaining in suspension. This, if proved, would be an argument of some weight in favour of the 'acid' form, but the evidence needs further confirmation.

Lastly, it is stated that the 'neutral' arsenate of lead is less liable to burn foliage than the 'acid' form. This has some support from experiments made in the United States. Possibly, in a very moist climate, the 'neutral' arsenate may have an advantage in this respect, but no injury has been reported, according to the knowledge of the writer, from the use of the 'acid' arsenate in any part of Canada We may conclude, therefore, that this danger, if such it be, is extremely small and that there is no overwhelming evidence at the present to show that either form is the superior, while, on the other hand, we know that both have been widely and successfully used throughout the Dominion.

PARIS GREEN.

This is placed on the market as a more or less fine powder (the finer the better) of a bright green colour. Undoubtedly it is the best known and the most largely used of all the arsenical insecticides. It is an aceto-arsenite of copper, insoluble in water and genuine samples, on examination, show not less than 50 per cent arsenious oxide. Soluble arsenic compounds should not be present in more than traces. Genuine Paris green is readily and completedly soluble in ammonia; any residue remaining after such treatment would indicate the presence of foreign matter and point to adulteration.

The examination some few years ago of a large number of samples of Paris green by the Inland Revenue Department, collected throughout the Dominion, showed that 95 per cent of those submitted to analysis were genuine, and it may be added that it has been very seldom that adulterated samples have reached the Farm laboratories. Two brands, which apparently had not previously been analysed in Canada and regarding which information was asked, have been examined by us during the past year.

ANALYSIS OF PARIS GREEN.

Laboratory No.	Brand and Manufacturer.	Water.	Total Arsenious Oxide	Cupric Oxide.	Soluble Arsenious Oxide.
		p.c.	p.c.	p.c.	p.c.
8838	"Lion Brand"—J. A. Blanchard, New York City.....	·48	57·61	29·20	1·54
11014	"Schweinfurter Grün" — Chemische Fabrik Schweinfurter, Schweinfurt, Germany....	·77	55·60	30·14	·74

No 8838.—As regards total arsenious acid, this sample is quite satisfactory. It is a genuine Paris green. The percentage of water-soluble arsenic is, however, somewhat higher than is desirable, making necessary the addition to the spray of a certain amount of lime when tender foliage is to be treated. (When used in Bordeaux Mixture no additional lime is needed, as such always contains a sufficient excess of this element to neutralize any free arsenious acid that may be present in the Paris green).

No. 11014.—Other names for Paris green are Schweinfurt's Green, Emerald Green, French Green. This sample labelled 'Schweinfurter Grün' sent us by the manufacturers 'Chemische Fabrik Schweinfurt, Schweinfurt, Germany' is seen to be of excellent quality. It is evidently well manufactured and contains only three-quarters of one per cent of water-soluble arsenic, calculated as arsenious oxide.

PHYTONAL.

This is a newly-introduced preparation manufactured and put on the market as an active insecticide by the Chemische Fabrik Schweinfurt, Schweinfurt, Germany. It is a dark-blue powder, smelling very strongly of ammonia and readily and completely soluble in water. This solution effervesces strongly on the addition of an acid, giving off carbonic acid gas. Analysis of a sample sent us by the manufacturers afforded us the following data:—

	Per Cent.
Arsenious Oxide	9·44
Cupric Oxide	5·28
Ammonium hydrate	40·74
Carbon dioxide	41·50

A second and smaller sample, insufficient for complete analysis gave

Arsenious Oxide	5·77
Cupric Oxide	3·08

In appearance and in giving off a strong odour of ammonia, this resembled the first sample.

Though the two samples are not alike as to their arsenic and copper content (due, no doubt, to loss of ammonia from one of the samples), the ratio of the cupric oxide to arsenious oxide is practically the same in both and, further, this ratio is essentially that of those constituents in Paris green. Thus,

Ratio CuO to As_2O_3, Phytonal, Sample No. 1	1: 1·80
" " No. 2	1: 1·87
" Paris green	1: 1·83

From these facts and from the general composition of the material, we may surmise it is prepared by dissolving Paris green (or a similar arsenical) in carbonate of ammonia and the evaporation, with suitable precautions, of the resulting solution to dryness.

Experiments in the laboratory have shown that, if left exposed to the air, Phytonal quickly decomposes, losing its ammonia and becoming more or less insoluble in water. It is essential, therefore, to keep the material in a tightly corked or stoppered container.

Phytonal, then, is an alkaline, arsenical compound, soluble in water, which from the standpoint of an insecticide, should present the poison in an active form and one non-injurious to foliage. It further seems probable that, used as a fine spray, the distribution of the poison would be more uniform upon the foliage than if the insecticide were merely in a condition of suspension—as is the case with Paris green.

Though no claims are made for this preparation as a fungicide, the probability is that it possesses marked fungicidal properties, since in certain important respects it closely resembles 'ammoniacal copper carbonate'—a spray used efficiently and successfully for many years, especially on maturing fruit and in cases where a stain would be objectionable.

For orchard use the manufacturers recommended the following solution.

Phytonal	2 lbs.
Sugar, syrup or soap	2-4 lbs.
Water	20 gallons.

Experiments are being conducted this season by the Horticultural Division to learn the efficiency and economy of this preparation for orchard use and for the protection of the potato crop.

LIME-SULPHUR WASHES.

The chemistry of the lime-sulphur spray has been discussed in previous reports of this Division and formulae and directions for the home manufacture of the wash, given. Though the use of 'lime sulphur' is steadily on the increase in fruit-growing districts, both as a winter spray against scale insects and for summer use in a more diluted form in the control of injurious fungi, we judge that the preparation on the farm of the spray from its constituents is fast giving place to the purchase of the manu-

factured wash. Unquestionably, the home manufacture is troublesome and disagreeable and considerable work may be avoided by the use of a commercial wash, such as is put upon the market by several firms. As to economy, possibly the 'home made' is somewhat cheaper per unit of disolved sulphur, though freight rates and quantities required will largely determine this point. The commercial wash will keep well if the air be excluded, as by a thin layer of coal oil, and it merely requires dilution to be ready for use. If a concentrated wash, that may be relied on as to strength, can be purchased at a reasonable price, allowing, of course, a certain margin for manufacture, it is more than probable that there will be less and less home preparation. Everything points towards the use of this wash becoming more general and displacing, to a considerable extent, Bordeaux mixture—though this latter fungicide continues to be esteemed as unsurpassed in its efficiency by many orchardists, especially for apple spot.

In our last report, we presented the analyses of a number of commercial brands sold in Canada, the results indicating an evident intention on the part of the manufacturers to put out a well-made wash of satisfactory strength. Further analyses, recently made in the Farm Laboratories, gave the following data:

ANALYSIS OF LIME SULPHUR-WASHES.

Laboratory No.	Brand.	Manufacturer.	Specific Gravity at 17·5° C.	Sulphur in Solution.	
				Total.	As Sulphide.
				p.c.	p.c.
11282	A.W.I.	Clarksburg, Ont.	1·2640	22·16	20·37
11321	Vanco	Chemical Laboratories, Ltd., Toronto	1·2676	23·20	21·87
11359	Grasselli	Grasselli Chemical Company, Cleveland and Toronto	1·2925	25·73	25·06
11385	Niagara	Niagara Brand Spray Company, Burlington, Ont.	1 2855	24·84	24·00
11386	Rex	The Rex Spray Company, Brighton, Ont.	1·3020	25·51	24·43

No. 11282.—This is a 'home-made' wash and was not intended for sale. It is somewhat weaker than the majority of 'commercial' washes, but otherwise is quite satisfactory.

No. 11321.—This sample was taken from a barrel obtained by the Horticultural Division in 1911, and, in consequence, had been manufactured at least nine months. Former samples of this brand have given somewhat higher results (see report 1909, page 186), and it seems quite probable that a certain amount of deterioration, through precipitation of sulphur, had taken place during storage. Exposure to air causes decomposition and deterioration of the wash; such deterioration may be much lessened by covering the wash, if it has to be kept for any length of time after opening the barrel, with a thin layer of coal oil.

No. 11359.—Three samples of this brand (Grasselli) were examined in 1909, and reported as quite satisfactory. The present sample is slightly richer in sulphide sulphur and is a well-prepared wash.

No. 11385.—This is evidently a well-made wash of full strength. It is satisfactory to note that the quality of this brand (Niagara) has, judging from our analyses, continued to improve; the present results place it among the best sprays on the market.

No. 11386.—This brand (Rex) has not hitherto been examined by us. The data afford satisfactory evidence as to its good quality. In both total sulphur and sulphur present as sulphides, it compares very favourably with those brands that are considered as well-made and of full strength.

The strength of the spray is a matter of considerable importance on the grounds of efficiency, economy and, when used in summer, harmlessness to foliage. Strength depends essentially on the amount of sulphur present as sulphide, though it is quite probable that other sulphur compounds, formed in variable amounts during the boiling of the wash, as thiosulphate, have some fungicidal value. To determine accurately the total sulphur in solution and the proportion of this sulphur present as sulphide, a chemical analysis is necessary, but for practical purposes, *i.e.*, for orchard use, it is sufficient to ascertain the specific gravity or density of the solution. In all well-made washes we may say that, the sulphide sulphur will vary (within small limits) with the density; the higher the specific gravity, the larger the proportion of sulphur present.

Although many experiments have been made in Canada and in the United States, during the past few years, it cannot be said that rigid standards as regards the best strengths of this spray for its various purposes have been as yet firmly established or generally recognized. No doubt climatic conditions prevailing in the district in which the spray is used materially influence its efficiency, and it is quite probable that the humidity of the atmosphere may, as with many fungicides, markedly affect its usefulness and harmlessness. However, sufficient evidence is on record to indicate that for San José (and probably other) scale on dormant trees in spring or autumn, the specific gravity of the spray should be in the neighbourhood of 1·03. For summer use, when the trees are covered with foliage, for control of the apple scab or 'spot' (and probably other fungous diseases) the specific gravity of the wash must not exceed 1·01 and, many orchardists use a spray for this purpose as low as 1·007. The preparation of such sprays by dilution, either from home-made washes or the purchased commercial washes, is a matter of comparative simplicity once the specific gravity of the original wash is known. Home-made washes vary greatly in strength, according to the formula employed and the thoroughness of preperation, and if a spray of known density is to be used, the specific gravity of the wash must be ascertained and the dilution made accordingly. Home-made washes examined by us have varied from 1·028 to 1·24 specific gravity. There is not the same variation to be found in commercial lime-sulphur washes put on the market by reputable firms, but, nevertheless, if exact work is to be done and the density is not stated by the manufacturers, the specific gravity should be taken.* The larger number of commercial brands examined in the Farm Laboratories during the last three years have ranged between 1·29 and 1·32 specific gravity, though a few have fallen as low as 1·26 or even 1·25.

To determine the density of a wash or spray, a specific gravity spindle or hydrometer will be necessary, and one ranging from 1,000 to say, 1,400, with a glass cylinder to hold the wash or spray while the determination is being made, can be purchased from a wholesale chemist or chemical supply house for about $1. The wash or spray to be tested is poured into the cylinder and the spindle carefully inserted; when the spindle has come to rest the scale indicating the specific gravity is read at the surface of the fluid. In the case of a home-made and self-boiled wash the temperature of the fluid should be allowed to fall to that of the atmosphere before making the test.

To ascertain the degree of dilution necessary to obtain a spray of a certain

* We believe it would be in the interests of all concerned if manufacturers would state the specific gravity of the wash on a label attached to the container. A law to this effect, properly enforced, would, in our opinion, greatly assist the orchardist and do no injustice to the manufacturer.

strength, the decimal of the specific gravity of the wash is divided by the decimal of the specific gravity of the spray desired; the quotient indicates the necessary dilution or put otherwise, the total volume to which one volume of the wash must be diluted. One or two examples may be given by way of illustration.

'A' is a home-made wash, found to have a specific gravity of 1·21. The necessary dilution for the spray on dormant wood will be obtained by dividing ·21 by ·03. Thus, $\frac{\cdot 210}{\cdot 03} = 7$ or total dilution required, using one volume of the wash. In practice this means that one gallon of the wash diluted with six gallons of water will yield seven gallons of spray of the desired strength, namely, 1·03 specific gravity.

If a summer spray of the density 1·009 is desired, the fraction will be $\frac{\cdot 210}{\cdot 009}$ = 23·3, or, one gallon of the wash must be diluted with twenty-two and one-third gallons of water.

'B' is a commercial wash with a specific gravity of 1·30. For the winter wash the fraction will be $\frac{\cdot 30}{\cdot 03} = 10$, or 1 gallon to 9 gallons of water; for summer use we have $\frac{\cdot 30}{\cdot 009} = 33{:}3$, or approximately 1 gallon to 32 gallons of water.

After dilution of the concentrated wash, the spray should be well stirred.

We have given this information for those using various formulæ in the preparation of home-made and self-boiled washes and for those who are desirous of doing exact work with the commercial brands. It is, however, open to question, in the present state of our knowledge, if the exact strength of the spray is a matter of vital importance, that is, as regards insecticidal and fungicidal effectiveness and harmlessness to foliage, though certain limits must of course be regarded. As we have said, most of the commercial washes of the larger firms have densities between 1.29 and 1.32 and, if a guarantee to this effect can be obtained, it would seem, judging from such evidence as is available, that dilutions could be made without any preliminary testing of the wash.

Using such washes for the preparation of a spray on dormant wood, dilutions from 1 to 8 to 1 to 11 have been recorded as equally effective.* Similarly, with these washes, dilutions ranging from 1 to 30 to 1 to 40 have been used without injury to foliage and good results as regards efficiency obtained. If such be the case then, having the approximate density, the taking of the specific gravity by the orchardist and the making of the subsequent calculation, may be safely omitted. We have always counselled carefulness in the making of sprays, and in this matter of the lime-sulphur wash useful information could no doubt be obtained by experimental work with sprays the exact strength of which had been established. We are, however, of the opinion that good and safe work can be done without using a hydrometer, provided a lime-sulphur wash of guaranteed density be employed.

In concluding this brief chapter, which indicates in part the nature of our work on these preparations, the writer wishes to suggest that the composition, at all events as regards active constituents, of manufactured insecticidess and fungicides should be printed on the label of the package. In the case of lime-sulphur washes the density should be stated. This would be useful information, as well as a guarantee

* The so-called winter spraying, viz., that used on dormant wood, is undoubtedly of the greatest importance; indeed, in the opinion of many orchardists, the most valuable of all the sprayings. This spraying, therefore, should never be neglected. In view of this, it seems desirable to point out that, as there is at the season of application, no foliage to injure, great care in regulating the strength of the spray is quite unnecessary. It is, of course, important that the spray shall be sufficiently strong to be effective—about 1·03 specific gravity, but if the spray is somewhat stronger it is immaterial, save perhaps on the score of economy.

to the purchaser and an advertisement of value to the reputable manufacturer. The law provides that information as to composition shall be given in the case of fertilizers and cattle foods of various kinds and it seems equally desirable that, in a similar way, the users of spraying materials should be informed and protected.

THE FERTILIZING VALUE OF RAIN AND SNOW.

This is a problem that has lately been receiving attention at the hands of agricultural chemists in many parts of the world and, thus, data of wide interest are accumulating towards a knowledge of the nitrogen compounds that may be annually washed out of the atmosphere by rain and snow to enrich the soil, in many latitudes, in countries of heavy and light precipitation, in rural districts and in the neighbourhood of towns and cities.

The systematic examination at Ottawa of every fall of rain and snow which would yield a sufficiency from the catchment area employed, was begun in 1907, so that we are now able to present the results from the fifth year of the investigation. It is our intention to continue the examination until a record for ten years has been obtained. The Central Experimental Farm, where collections are made, is situated on the outskirts of Ottawa, a rapidly growing city, but one which is residential rather than manufacturing, though from time to time a tall chimney is built to add its quota of smoke. As a rule the atmosphere is very clear, general smokiness or fog being exceptional. The catchment basin is placed about twenty-five feet from the ground, which for some distance around is covered with grass and shrubbery. This arrangement, we think, prevents, to a considerable degree, contamination with dust, a factor that our results show, from analyses after high winds, affects the data more markedly than smoke, though no doubt the direction of the prevailing wind, either to or from the city, somewhat influences the nitrogen-content of the rain. Another factor affecting this datum and one that has been many times remarked, is frequency of precipitation. Thus, after a period of several days or longer of dry weather, the nitrogen-content will be high, whereas samples taken from a succession of rains following one another at short intervals show a steady decline as the atmosphere is purified by successive washings. Violent thunderstorms, especially after a period of drought, usually means an excessive nitrogen-content in the rain, probably largely owing to the air at the time being full of dust resulting from the high winds usually accompanying them, though no doubt the electric discharges (lightning flashes) increase somewhat the proportion of nitrates.

In the following table are presented the monthly totals for the precipitation, the average nitrogen-content for the month expressed as 'free' and 'albuminoid' ammonia and as nitrates and nitrites and the pounds of nitrogen per acre so supplied. The number of analyses made of rain and snow within the year was 92.

RAIN AND SNOW AT OTTAWA FOR THE YEAR ENDING FEBRUARY, 1912..

Month and Year.	Precipitation in Inches.			Nitrogen.				Pounds of Nitrogen per Acre.
	Rain.	Snow.	Total in Inches of Rain	In Free Ammonia.	In Albuminoid Ammonia.	In Nitrates and Nitrites.	Total.	
1911.				p.p.m.	p.p.m.	p.p.m.	p.p.m.	
March	·26	19·75	2·24	·409	·055	·154	·618	·314
April	1·07	4·00	1·47	·615	·159	·294	1·068	·356
May	2·80	.....	2·80	·914	·148	·406	1·468	·931
June	3·64	.....	3·64	·330	·045	·140	·515	·425
July	2·79	.....	2·79	·675	·132	·510	1·317	·833
August	1·47	.....	1·47	·650	·055	·432	1·137	·379
September	2 98	.....	2·98	.683	·107	·414	1·204	·813
October	2 10	.....	2·10	.675	·025	·332	1·032	·491
November	1·73	12·00	2·93	.602	·055	·252	·909	·604
December	1·31	13·75	2·68	·357	·035	·231	·623	·378
1912.								
January	·11	25·00	2·61	140	·066	·177	·383	·226
February	·07	29·75	3·05	·271	·049	·187	·507	·350
Total for 12 months	20·33	104·25	30.76					6 100

The total precipitation, 30·76 inches, exceeded that of the preceding year by 3·79 inches but was not quite equal to the average for the past 21 years, which is 34·21 inches. Compared with the record of the previous twelve months, we find the snowfall 31·25 inches, and the rain ·66 inches, heavier. The precipitation was well distributed throughout the year; in two months only—April and August—was the fall less than 2 inches, and in one month only, June, can it be said to have notably exceeded 3 inches.

The amount of combined nitrogen in the rain and snow during the year, it will be observed, was 6·1 lb. per acre, which is ·829 lbs. more than for the previous year and, if we except 1909 when the results were abnormally high, owing to bush fires, ·459 lbs., above the average from the yearly data during the period of investigation, February, 1907-February, 1912. The following tabulated statement allows of a ready comparison of the precipitation data and amounts of nitrogen per acre determined during the past five years.

PRECIPICATION AND AMOUNT OF NITROGEN PER ACRE, OTTAWA, 1908-1912.

—	Rain in Inches.	Snow in Inches.	Total Precipitation in Inches.	Pounds of Nitrogen. per Acre.
Year ending February 29, 1908	24·05	133·00	37·35	4·322
" " 28, 1909	22 99	96·25	32·63	8·364
" " 28, 1910	28·79	80·75	36·87	6·869
" " 28, 1911	19·67	73·00	26·97	5·271
" " 29, 1912	20·33	104 25	30·76	6·100
Average for 21 years	24·99	92·18	34·21	

The nitrogen furnished by the rain was 5·075 lbs. and by the snow 1·025 lbs., the proportion of the whole being 83 per cent and 17 per cent respectively. For the experimental period the figures in this regard are as follows:—

AMOUNTS OF NITROGEN FURNISHED BY RAIN AND SNOW.

—	Total	By Rain.		By Snow.	
		Pounds.	Proportion.	Pounds.	Proportion.
	Lbs.		Per cent.		Per cent.
Year ending February 29, 1908.....	4·322	3·243	75	1·080	25*
" " 28, 1909	8·364	7·528	90**	·836	10
" " 28, 1910.....	6·869	5·83	85	1·04	15
" " 28, 1911	5·271	4·424	84	·847	16
" " 29, 1912.....	6·100	5·075	83	1·025	17

* Snowfall exceptionally heavy.
** Rain abnormally rich in ammonia due to bush fires.

Of the total nitrogen furnished per acre (6·1 lbs.) we find 4·209 lbs., or approximatetly 70 per cent, as free and organic ammonia and 1·891 lbs., or approximately 30 per cent, as nitrates and nitrites.

AVERAGE NITROGEN-CONTENT OF RAIN AND SNOW.

(Amount of Nitrogen per Acre as Free and Albuminoid Ammonia and as Nitrates and Nitrites.)

—	Number of Samples Analysed.	Precipitation in Inches.	NITROGEN.								
			Parts per Million.				Percentage of Total.			Per Acre.	
			In Free Ammonia.	In Albuminoid Ammonia.	In Nitrates and Nitrites.	Total.	In Free Ammonia.	In Albuminoid Ammonia	In Nitrates and Nitrites.	As Free and Albuminoid Ammonia.	As Nitrates and Nitrites.
Rain.....	62	20·33	·694	·078	·330	1·102	63	7	30	3·553	1·522
Snow.....	30	104·25	·228	·053	·157	·438	52	12	36	·656	·369

Again, the data show the greater richness of the rain in nitrogen compounds, and the evidence supports our previous statement that, both relatively and absolutely, rain furnishes more nitrogen to the soil than snow.

As in the preceding year, 70 per cent of the nitrogen in the rain was free and organic ammonia and 30 per cent as nitrates and nitrites. For the snow we obtain 64 per cent and 36 per cent, respectively, for these compounds.

THE WATER SUPPLY OF FARM HOMESTEADS.

The shallow well, that is, one usually between 10 and 30 feet in depth, collecting the water from the surrounding soil and subsoil, is the source of supply most commonly found on the farm homestead and in the village. Provided that the environment is satisfactory from the sanitary standpoint, such wells may yield excellent water, but when, as is usually the case, convenience to the house or farm buildings is alone considered, the chances are that it is only a very short time after the location of the well before the water is polluted. On the larger number of farms we find the well sunk in the barnyard (where there must necessarily be more or less of an accumulation of manure) or under the barn or stable, or at no great distance from the privy (frequently a mere hole in the ground), or close to the back door, out of which the household slops are thrown and near which the garbage heap with all sorts of refuse may be found. It cannot be too strongly emphasized that wells so situated inevitably become contaminated.

It is quite true that most soils, and more particularly those that are porous and well aerated, such as gravels and sands, possess filtering and purifying properties in a marked degree, but the soil surrounding wells located as described must in time become saturated with organic filth of a most objectionable character, and it is then no longer able to purify but rather serves to contaminate the water passing through it to the well, which, under such conditions, may be said to act as a cess-pit.

Further, we frequently find these wells through faulty construction or insufficient protection become the watery grave for rats, mice, frogs and other small animals, the decomposing bodies of which render the water foul and unfit for use. Rotten crib work is another but not so dangerous a source of contamination. Imperfect protection of the mouth of the well may also allow the entrance of surface wash. If these latter features are guarded against and the well lined to a depth, say, of 10 feet with puddled clay or concrete, safeguards of very considerable value have been provided but they must not be solely relied on if the well is badly located.

For those who must depend on the shallow well as the source of their supply, we would strongly advocate an undisturbed area, say of 50 yards radius around the well, to be kept free from manure and all deposition of filth.

Much better water, as a rule, can be obtained from the bored or driven well, tapping a deep-seated source, and especially is this the case when the rock strata through which the well is driven are free from fissures and cracks and care is taken that there is no possibility of surface water finding its way downwards between the piping and the sides of the boring. With such a well and a pump actuated by a windmill, small gasoline or hot air engine, water of good quality can be supplied to the farm buildings for the watering of stock and to the farm house for the bath room and kitchen. Such an arrangement would mean much, not only in the matter of convenience and the saving of labour, but in the still more important matter of securing a supply that would lead to better thrift in the stock and better health in the family.

Since 1887, we have analysed some thousands of samples of waters from farmers' wells and a survey of this work shows that not more than one-third of the waters examined in any year could be pronounced as safe and wholesome. These results may not represent the condition of the farm supplies throughout the Dominion, but of this there can be little doubt, that of the waters used on our farms there is a large proportion positively unsafe for use. Yet there is probably no better watered country in the world, the natural waters of Canadian lakes, streams and springs being of the purest. It is quite possible, therefore, on the majority of farms, save in certain semi-arid districts of the Northwest, to obtain an ample supply of good water. Admitting this, it seems well worth while to continue the crusade for better water on

the farm, and in this connection it is gratifying to be able to report an increasing interest in the matter of pure water on the part of our rural population. Instances are becoming more numerous every year of farmers going to considerable expense to secure a good and ample supply, and piping it for use in the farm house and for the watering of their stock.

In the appended table, the sanitary analyses of 90 samples examined during the past year are given. Of these, 22 were reported as pure and wholesome, 26 as highly suspicious, 24 as seriously contaminated and 18 as saline.

In conclusion, it may be stated that analyses of well waters are made free of charge by the Division of Chemistry, Experimental Farm, Ottawa, provided the samples are collected and shipped in accordance with instructions that are sent on application.

ANALYSES OF WELL WATERS, 1911-12.

Reesults Stated in Parts per Million.

Number.	Locality.	Marks.	Date.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates and Nitrites.	Chlorine.	Total Solids at 105° C.	Solids after Ignition.	Loss on Ignition.	Phosphates.	Report.
1	Evesham, Sask.	E.G.	April 1	Free.	·04	·06	2·8	666·4	495·2	171·2	F. trace.	Free from pollution.
2	Breckenridge, Que	W.J.G	" 3	2·60	·03	Free.	1600 0	2699·2	2530·0	169·2	Free.	Saline.
3	Margo, Sask.	V.P.	" 4	Free.	·47	"	30·0	4924·0	3852·0	1072·0	"	"
4	Maidstone, Sask.	E.C.	" 4	1·56	·06	·12	106·0	1892·8	1674·4	218·4	"	Free from pollution.
5	Rockland, Ont.	W.C.E.	" 8	Free.	·01	3·12	5·0	332·8	264·0	68·8	"	Probably free from pollution.
6	Breckenridge, Que	W.J.G.	" 15	2·55	·02	Free.	1600·0	2686·0	2518 4	167·6	V. F. T.	Saline.
7	St. Philip, Que.	J.R	" 22	·15	·04	"	350·0	933·2	880·0	53·2	Free.	Suspicious.
8	Endiang, Alta	R.A.	May 3	3·99	·12	"	50·0	3157·0	1850·0	307·0	"	Saline.
9	Ottawa, Ont.	F.S.A., No. 1.	" 3	·02	·18	·17	6·0	64·0	29·2	34·8	"	Unpolluted.
10	"	" " 2.	" 3	·21	·07	·09	3·5	157·6	126·4	31·2	....	"
11	"	" " 3.	" 3	·92	·01	·62	2·5	185·6	152·0	33·6	....	"
12	Lamerton, Alta	F.W.F.	" 13	·02	·12	3·03	22·0	4227·0	3592·0	635·0	Free.	Strongly saline.
13	Outlook, Sask.	J.E.A.	" 16	·02	·22	·19	72·8	6131·0	4981·5	1149·5	"	" "
14	Kamloops, B.C.	T.C.H., No. 1.	" 20	Free.	·03	·18	17·5	775·2	646·4	128·8	"	Free from pollution.
15	"	" " 2.	" 20	·03	·015	·10	9·0	551·2	444·8	106·4	"	" "
16	Sussex, N.B.	S.C.McC., No. 1	June 2	Free.	·04	·39	4·0	202·4	160·0	42·4	"	Good and wholesome.
17	"	" " 2	" 2	"	·03	·00	5·0	79·2	52·0	27·2	"	" "
18	Ottawa, Ont.	W.L.S.	" 5	"	·12	8·84	35·0	454·4	274·4	180·0	"	Very suspicious.
19	Clarkstown, Ont.	A.B.	" 7	·43	·05	Free.	38·0	601·2	538·8	62·4	"	Not potable.
20	Rivermeade, Que.	J.R.	" 7	·23	·24	5·66	38·0	644·8	460·8	184·0	"	Seriously contaminated.
21	Blakeney, Ont.	J.McG.	" 10	1·08	·03	Free.	108·0	714 8	600·0	114·8	"	Probably contaminated.
22	Chatham, N.B.	J.B.S., No. 1.	" 17	·07	·03	"	520·0	1016·0	973·6	142·4	"	Saline.
23	"	" " 2.	" 17	·27	·05	8·42	300·0	1121·6	852·0	269·6	"	"
24	Dunham, Que.	G.P.E.	" 19	Free.	·18	5·70	30·0	214·4	145·6	68·8	"	Very suspicions.
25	Parc Laval, Que.	Z.P.	" 28	·19	·06	5·88	40·0	618·8	480·0	138·8	"	Polluted.
26	Oak Bluff, Man.	W.W.	" 29	2·40	·13	Free.	350·0	2314·0	1903·0	411·0	Trace.	Contaminated.
27	The Brook, Ont	Z.L.	July 4	3·22	·13	"	1750·0	3241·6	2960·0	281·6	Free.	Saline.
28	Ottawa South, Ont.	G.A.	" 7	Free.	·03	10·75	18·0	450·0	230·0	220 0	"	Suspicious.
29	Rockliffe, Ont.	A.K.	" 19	·06	·10	2·03	9·0	458·0	298·0	160·0	"	"
30	C. Ex. Farm, Ont.		" 20	Free.	·04	·92	6·0	306·0	229·0	77·0	"	Unpolluted.
31	Shelburne, N.S.	W.J.McG.	Aug. 3	3·60	·10	·83	110.0	190·0	152·5	37·5	"	Very seriously contaminated.
32	Hurdman's Bridge, Ont.	T.C.E.	" 5	·42	Free.	Free.	30·5	299·2	278·0	21·2	"	Suspicious.
33	Minton, Que.	S.K.	" 5	·10	"	·88	2·0	110·0	70·0	40·0	"	Probably contaminated.
34	Aylmer Road, Que.	G.L.O.	" 10	Free.	"	·03	5·0	273·6	205·6	68·0	"	Excellent
35	Elkhorn, Man.	C.E.R.	" 11	1·47	"	Free.	150·0	1862·8	1598·8	264·0	"	Suspicious.

ANALYSES OF WELL WATERS, 1911-12—*Concluded.*

RESULTS STATED IN PARTS PER MILLION.

Locality.	Locality.	Marks.	Date.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates and Nitrites.	Chlorine.	Total Solids at 105° C.	Solids after Ignition.	Loss on Ignition.	Phosphates.	Report.
36	Cayley, Alta	H.C.W	Aug. 15	Free.	·04	Free.	13·0	2560·0	2510·0	50·0	Free	Free from organic pollution.
37	Snepard, Alta	D.W.T	" 16	"	·05	"	20·0	604·0	564·8	39·2	"	Free from contamination.
38	High Falls, Que	L.P.	" 16	·20	Free.	"	1900·0	4221·2	3266·0	955·2	"	Saline.
39	Rivermede, Que	J.A.R.	" 21	·06	"	·08	21·0	402·0	316·0	86·0	"	Contaminated.
40	Winona, Ont	J.J.F	" 21	5·00	"	Free.	1150·0	4982·0	4168·0	814·0	"	Strongly saline.
41	Shanly, Ont	T.R.W	" 23	·37	·10	"	80·0	608·0	440·0	168·0	Hy. trace	Dangerously polluted.
42	Bonfield, Ont	J.H.T.	" 23	·07	·08	1·14	4·5	82·8	48·4	34·4	"	Contaminated.
43	Applehill, Ont	P.D.McI.	" 23	Free.	Free.	2·05	30·0	343·0	238·0	105·0	Free	Decidedly suspicious.
44	Hull, Que	L.G.S.	" 25	·23	"	Free.	80·0	476·8	454·8	22·0	V. F. T.	Suspicious.
45	Carlsbad Springs, Ont	L.B.	" 29	9·00	·23	"	5200·0	13310·0	8925·0	4385·0	F. trace	Saline.
46	" "	"	" 29	4·00	1·13	"	5200·0	13195·0	8790·0	4405·0	Free	"
47	Rivermede, Que	J.A.R.	" 30	·06	Trace.	·07	15·0	347·6	282·0	65·6	Trace	Contaminated.
48	St. Barnabé, Que	E.B	Sept. 5	11·10	·20	Free.	5150·0	9650·0	9010·6	640·0	Hy. trace	Strongly saline.
49	Sand Point, Ont	A.D.	" 7	2·70	·76	"	15·0	394·0	258·0	136·0	"	Dangerously polluted.
50	Ironsides, Que	P.S.	" 13	Free.	·02	·40	1·0	132·0	72·0	60·0	Free	Excellent.
51	St. Hyacinthe, Que	S.P.M., No. 1	" 15	·33	·03	Free.	70·0	605·0	425·0	180·0	F. trace	Suspicious.
52	" "	" " 2	" 15	·35	·02	"	70·0	574·0	460·0	114·0	"	"
53	Aylmer, Que	L.D.S.	" 18	·16	·02	"	18·5	212·0	178·8	33·2	Free	"
54	Victoria, B.C.	J.D	" 21	·13	Free.	"	7·5	140·0	108·0	32·0	Trace	Wholesome.
55	Rockliffe, Ont	A.C.	" 26	·10	Trace.	·12	3·0	326·8	258·8	68·0	Free	Suspicious.
56	Westboro, Ont	C.E.J.B.	" 29	·02	·08	8·63	1650·0	6598·0	4188·0	2410·0	"	"
57	Avonmore, Ont	W.M.R	Oct. 2	·16	·14	Free.	12·0	419·2	291·2	128·0	F. trace	Contaminated.
58	Ailsa Craig, Ont	R.R.C.	" 7	7·62	·41	Free.	17·5	510·0	340·8	169·2	Trace	Seriously polluted.
59	Mather, Man	J.A.F., No. 1	" 7	2·22	·53	"	150·0	4261·8	3356·0	905·8	Free	Not potable.
60	" "	" " 2	" 7	·20	·12	1·65	20·0	1252·0	1108·0	144·0	"	Suspicious.
61	" "	" " 3	" 7	3·58	·23	Free.	1850·0	3875·0	3351·0	524·0	"	Not potable.
62	Rockliffe, Ont	A.C.	" 9	·12	Free.	·14	3·5	332·8	281·6	51·2	Trace	Suspicious.
63	St. Héléne de Chester, Que	A.B.	" 10	Free.	·53	Free.	5·5	62·4	26·4	36·0	Hy. trace	"
64	Caseleyville, Alta	J.J.W.	" 11	2·60	·04	Free.	12·5	4855·2	3487·2	1368·0	Free	Saline.
65	Elkhorn, Man	E.G.W.	" 19	22·82	·07	1·24	9250·0	16190·0	15290·0	500·0	V.F. trace	Strongly saline.
66	Bonaccord, Alta	J.L.R.	" 23	Free.	·12	Free.	1·5	274·4	236·4	38·0	Free	Free from pollution.
67	Aylmer, Que	G.P.M.	" 26	·07	·04	·003	27·5	430·8	334·0	96·8	F. trace	Suspicious.
68	Rockliffe, Ont	A.C.	" 27	·10	01	·098	3·2	332·0	260·4	71·6	"	"
69	Metcalfe, Ont	R.A.G.	" 31	·68	·28	·91	100·0	640·0	480·0	160·0	Trace	Polluted.
70	Green Ridge, Man	Mrs. E. J. F.	" 31	14·52	·18	·57	4300·0	14302·4	6178·4	8124·0	Free	Saline.

71	Carp, Ont	F.T.A.	Nov.	7	·12	·16	Free	480·0	1360·0	1216·0	144·0	Trace.	Seriously contaminated.
72	Norton, N.B.	N.C.	"	9	Trace.	·04	·36	32·5	270·0	240·0	30 0	Free.	Suspicious.
73	Truro, N.S.	C.P.M.	"	11	Free.	·10	Free.	9·0	118·4	60·0	58·4	F. trace.	Free from pollution.
74	Felton, Ont.	S.M.	"	16	·88	·04	"	175·0	1940·0	1575·0	365·0	Hy. trace.	Very suspicious.
75	Marathon, Ont.	D.H.W.	Dec.	2	·82	·11	"	210·0	1333·2	1184·8	148·4	"	Dangerously polluted.
76	Grand Bay, N.B.	Mrs. S. R.	"	2	Free.	·01	Trace.	7·5	37·6	21·2	16·4	Free.	Wholesome.
77	Blenheim, Ont.	G,W.M.	"	9	·86	Free.	Free.	450·0	1056·0	960·0	96·0	"	Polluted.
78	Grondines, Que.	O.M.	"	29	1·22	·25	"	190·0	956·8	866·8	90·0	"	Very suspicious.
79	Cantley, Que.	T.F.	Jan.	2	1·92	·10	"	500·0	1006·4	952·4	54·0	Trace.	Seriously polluted.
80	Ottawa, Ont.	J.C.T.	"	5	·30	·32	9·55	250·0	1722·4	1260·4	462·0	"	Polluted.
81	Norwood, Ont.	J.E.R.	"	10	8·00	·20	Free.	21000·0	45164·0	29988·8	15176 0	"	Strongly saline.
82	Ottawa S., Ont.	A.L.	"	11	Free.	·07	12·24	120·0	917·2	485·6	431·6	F. trace	Very suspicious.
83	Ways Mills, Que.	J.M.B.	"	25	"	·44	·25	Free.	168·0	103 0	65·0	Free.	Quite free from pollution.
84	Ironsides, Que.	A.T.D.	"	31	"	·05	14·5	160·0	601·6	368·8	232·8	Hy. trace.	Suspicious.
85	Keyes, Man.	A.B.	Feb.	15	·40	·26	Free.	1250·0	5261·2	3744·0	1517·2	Free.	"
86	Wauchope, Sask.	J.B.	Mar.	4	·10	·50	"	4·0	607·6	437·6	170·0	Hy. trace.	Free from pollution.
87	Arnprior, Ont.	R.J.S.	"	11	Trace.	Trace.	12·21	36·0	624·0	364·0	269·0	"	Polluted.
88	Camrose, Alta.	J.W.	"	27	Free.	·10	·11	52·0	904·0	840·8	63·2	Trace.	Free from pollution.
89	Carp, Ont.	W.D.J.	"	28	·08	·04	·14	26·0	395·2	305·2	90·0	"	Decidedly polluted.
90	Jacksonville, N.S.	R.M.J.	.	30	1·78	·45	Free.	30·0	152·8	82·8	72·0	"	Seriously "

REPORT OF THE DOMINION ENTOMOLOGIST

C. GORDON HEWITT, D.Sc.

OTTAWA, March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Department of Agriculture, Ottawa.

SIR,—I have the honour to submit herewith my third Annual Report of the work of the Division of Entomology, covering the year beginning April 1, 1911, and ending March 31, 1912. This report gives a summary of the more important work carried on during the above period and refers to the depredations of those insects which were unusually abundant and injurious and which received our attention.

In all the branches of the Division's activity, there has been a marked increase in the work, and its development along the various lines outlined in the subsequent account indicates the manner in which our work is affecting and proving of benefit to an increasing number of those engaged in agriculture, horticulture and forestry, and to the sanitarian who must consider insects as affecting the public health.

For the sake of convenience the report of our work may be considered under the following sections:—

1. The administration of the Destructive Insect and Pest Act, including—
   (*a*) Inspection and fumigation of imported nursery stock, etc.
   (*b*) Field work against the Brown-tail Moth.
2. Insects affecting field crops.
3. Insects affecting fruit crops.
4. Forest insects.
5. Insects affecting domestic animals and man.
6. Insects affecting garden and greenhouse.
7. Apiculture.
8. Miscellaneous.

1. ADMINISTRATION OF THE DESTRUCTIVE INSECT AND PEST ACT.

(*a*) THE INSPECTION AND FUMIGATION OF IMPORTED NURSERY STOCK.

With the opening up of the country, the extension of orcharding and horticulture and the growth of our cities there is naturally a concomitant annual increase in the numbers of trees and plants, classed as nursery stock, imported into Canada from foreign countries.

An additional fumigation house has been erected at the fumigation station at Niagara Falls to meet the increase in the importations.

The following table indicates the value of trees, plants and shrubs included in the term nursery stock and imported into Canada during the year ending March 31, 1911:—

United States	$44,828	Japan	$361
Holland	11,249	Russia	248
France	4,260	Denmark	180
British Isles	3,636	Australia	20
Belgium	2,036	China	16
Germany	1,148		
			$67,982

The different sources of our imported trees and plants are an indication of the risk which we run of having insect pests introduced by such means from the various countries. All nursery stock from countries other than European is fumigated before entry to prevent the introduction of San José Scale.

Nursery stock from Europe, Japan and the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island is inspected either at the port of entry or at its destination. The following table gives a summary of the results of the inspection of imported stock during the season 1910-11, the season ending on May 15:—

Country of Origin.	Fruit Trees and Fruit Seedlings.	Ornamental Shrubs and Evergreens.	Greenhouse Plants.
France	2,590,750	644,925	3,150
Holland	261,875	338,408	4,299
British Isles	98,533	73,754	484
Belgium	100	1,825	18,461
United States (six)		4,185	
Japan		2,672	
Germany		211	525

Total Fruits	2,951,258
Total Ornamentals	1,065,980
Total Greenhouse	27,075
Total number of plants inspected	4,044,313

Only a single nest of the Brown-tail Moth was discovered on French shipments during the inspection season of 1910-11 compared with 310 nests found during the importation season 1909-10. Two causes would appear to have contributed to this scarcity of Brown-tail Moth nests on the French nursery stock: first, the Brown-tail Moth was less abundant in the neighbourhood of the nurseries and secondly, there was greater care on the part of the French nurserymen. It is gratifying to be able to record that the President of the French Republic, on May 1, 1911, issued a decree establishing a department charged with the inspection of plants for insect pests and plant diseases, (*un service d'inspection phytopathologique*). This department will inspect nurseries and issue certificates. The French Minister of Agriculture has issued regulations which will insure the appointment of qualified inspectors. This is a source of no little pleasure as I feel it will not only be a powerful adjunct to our work of inspecting the imports when they arrive in Canada, but the issuing of reliable certificates will do much to redeem the character of the French inspection certificates, the issuing of which has been abused to so great an extent in the past that we have found in our inspection work as many as thirteen nests of the Brown-tail Moth in a case of French nursery stock bearing an inspection certificate duly signed, nor was this an isolated case.

In our work of inspecting and fumigating nursery stock we are frequently informed that shipments bear an inspection or fumigation certificate and it is accordingly assumed that they are exempt from fumigation or inspection. We do not at present accept the fumigation or inspection certificate of any country or state.

While the certificates of certain countries and states might be safely accepted there are others where such acceptance is impossible. This is especially the case where the nurseries are inspected only within a certain period and such a period is too long to guarantee the freedom of the nursery from certain insects. Further, the possibility of dishonest or careless nurserymen attaching fumigation certificates to nursery stock requiring fumigation under the laws of the country or state of origin is not always sufficiently safeguarded. At present we inspect every imported plant upon which such insects as for example the Brown-tail and Gipsy Moths might be introduced, and fumigate all plants upon which the San José Scale might be carried.

Owing to the fact that the province of British Columbia has powers under the Regulations issued under section 55 of the 'Agricultural Associations Act, 1911' of the Province of British Columbia to inspect and fumigate nursery stock imported into British Columbia, thereby carrying out the provisions of the Dominion Destructive Insect and Pest Act, an agreement has been made between the Dominion and Provincial Departments of Agricluture whereby the work of fumigating and inspecting nursery stock imported into Canada through the port of Vancouver will, in future, be carried out under the direction of the Provincial Inspector of Fruit Pests. So far as the carrying out of the requirements and regulations of the Dominion Destructive Insect and Pest Act is concerned the work is under the supervision of the Dominion Entomologist and at least one officer of the Dominion Division of Entomology will assist in the work and furnish monthly returns to this office. This agreement is very satisfactory and will prevent the possibility of any duplication in the future of the inspection and fumigation of nursery stock imported into British Columbia through Vancouver. The possession of similar powers in respect to the inspection and fumigation of imported stock has lead to duplication of the work in the past, but by the new arrangement this will be avoided in the future to the satisfaction of all concerned.

(*b*) FIELD WORK AGAINST THE BROWN-TAIL MOTH.

The most notable feature of the Brown-tail Moth work for the season ending in the Spring of 1911 was the discovery that the infestation had spread from the State of Maine into New Brunswick. Reference was made in my last Annual Report (*page 218*) to this fact, and nests were discovered over a considerable area. In November, 1911, Mr. J. D. Tothill, who was placed in charge of the field work in New Brunswick, began scouting the infested territory with a force of six inspectors, half of the force being employed by the provincial Department of Agriculture in accordance with our arrangement for co-operation in the work. Later during the present season (1911-12) however, the infested territory was found to be of so great an extent that the field force was increased to twelve men. As the seasons work will not be completed until May, the present report of the Brown-tail Moth work will refer, as in previous years, only to the work completed in May 1911; that is, for the season 1910-11. In connection with the New Brunswick work it may be noted that at the time of writing the infestation has now been found to have spread into seven counties, namely, Charlotte, Carleton, York, Sudbury, Queens, Kings and St. John. The result of this season's work will be included in my next annual report.

The work of scouting for and destroying the winter webs of the Brown-tail Moth in Nova Scotia from December 1910 to May 1911 was carried out by two parties, each consisting of three men, working under Mr. G. E. Sanders field officer of this Division, and Mr. H. G. Payne a provincial inspector, respectively. The following is a list of the localities and numbers of winter webs which were destroyed in the same during the season and indicates the degree of infestation for the period specified:

Kings County: Kingston	2
Annapolis County: Lawrencetown	6
W. Paradise	12
Tupperville	1
Mochelle	7
Lequille	108
Granville Centre	1
Clementsvale	1
Deep Brook	118
Paradise	11
Bridgetown	601
Carleton Corner	234
Round Hill	268
Annapolis	2
Granville Ferry	1
Upper Clements	2
Digby County: Smiths Cove	18
Digby	3
Acaciaville	2
Brighton	2
Bloomfield	1
Ashmore	1
Plympton	2
Weymouth	1511
Danvers	17
Hassett	1
Digby County: Bear River	614
Acacia Valley	1
Marshalltown	1
Barton	18
Gilbert's Cove	2
Melanson Settlement	6
South Range	29
Southville	643
Riverdale	3
Hillburn	16
Concession	1
Church Point	1
Meteghan	1
Forest Glen	1
Woodstock	1
Lower Meteghan	1
Fort Point	2
Lower Saulnierville	2
Meteghan River	3
Lake George	1
Beaver River	1
Yarmouth County: Carleton	5
Ohio	1
Hebron	1
Deerfield	1
Bloomfield	1

The total number of webs collected was 4,490 compared with 1,484 during the previous season (1909-10.)

The large infestation at Weymouth, where the caterpillars were found on low-growing wild rose bushes when I visited the locality in June, 1911, was due chiefly to two causes: primarily to the fact that a large pulp mill which worked day and night had attracted the female moths by the brilliant illumination during the flying season and secondarily to the fact that the locality had not been well scouted during the previous winter and the insects had increased in the locality. Several cases of 'Brown-tail rash,' caused by the poisoned hairs of the caterpillars, were reported.

The more seriously infested localities, such as Weymouth, Southville, Bear River, Bridgetown, etc., were sprayed with lead arsenate as soon as the scouting work was completed and the trees had finished blossoming. The caterpillars were then almost fully grown and an earlier spray, had it been possible, would have been still more effectual.

The following list indicates the number of webs found on the different species of food plants during the season 1910-11. The decided preference for apple is an important point to note.

Apple	3,829
Thorn	207
Plum	146
Pear	106
Wild Pear (Amelanchier)	28
Oak	20
Elm	17
Barberry	1
Wild Rose	13
Sweet cherry	11
Maple	8
Wild cherry	1
Quince	1
Acacia	1
Beech	1

Mr. G. E. Sanders, in addition to directing the scouting work, carried on a number of experiments and made a number of observations on the Brown-tail Moth larvae. It was found that a considerable proportion of the winter webs dropped on to the ground during the winter, thereby escaping destruction. A series of experiments showed that when winter webs had been kept frozen in a solid block of ice for eight weeks, thirty per cent of the larvae emerged in an apparently healthy condition when the ice was melted and the webs dried. Counts were made of the number of hibernating larvæ at the end of the winter. In the course of the work a winter web on apple was found to contain 1,852 young caterpillars. These observations are being continued during the present season both in Nova Scotia and in New Brunswick.

Through the kindness of Dr. L. O. Howard, Entomologist to the United States Department of Agriculture, we were enabled to commence importing parasites of the Brown-tail Moth. These parasites the United States Department of Agriculture and the State of Massachusetts have at enormous expense imported from Europe and have succeeded in establishing in the New England States. Several hundred puparia of a tachinid, *Compsilura concinnata* Meigen–a two-winged fly–parasitic on both the Gipsy and Brown-tail Moths, were placed in the neighbourhood of St. Stephen, N.B. The absence of proper facilities in the way of a field laboratory for carrying on the work, however, prevented us from attempting any further work during 1911. Arrangements are now being made for the establishment of a field laboratory in New Brunswick where the work of breeding and colonizing the parasitic and predaceous enemies of the Brown-tail Moth will be carried on and Dr. Howard has expressed his willingness to supply us with material from Massachusetts for which co-operation we are most deeply indebted. Not only is the Brown-tail Moth spreading northward along the Atlantic coast in increasing numbers, but the Gipsy Moth is also advancing towards our frontier and it will be only a question of time before it also invades Canada. On the latter account and also in view of the comparatively light infestation of the Brown-tail Moth it is of the greatest importance that we should take steps towards establishing the natural means of control, namely parasitic insects and fungal disease which are the only means by which ultimate control of these pests will be gained. It has been found that certain of the enemies of the Brown-tail Moth and Gipsy Moth such as the predaceous beetle *Calosoma sycophanta*, the tachinid parasite *Compsilura concinnata* and the chalcid parasite *Monodontomerus aereus* and others which have been imported from Europe and Asia will attack certain of our native insects. We hope, therefore, to establish certain of these enemies of the Brown-tail and Gipsy Moths in New Brunswick on the native insects in order that they will be present and able to turn their attention later to the Brown-tail and Gipsy Moths. Thereby we shall be more prepared when the infestation increases in abundance, as it undoubtedly will.

2. INSECTS ATTACKING FIELD CROPS.

The following were the more important of the insects affecting field crops, including roots and vegetables, which were reported to the Division or were subject of investigation. In addition we received an increasing number of inquiries relating to many other species.

CUTWORMS.

Throughout Canada, from Nova Scotia to British Columbia, injuries from cutworms were reported. In Saskatchewan and Alberta cutworms were unusually abundant and destructive in certain sections destroying not only roots, vegetables and garden crops but also grain crops to a serious extent. One of the worst reports was received from a correspondent at Monarch, Alta., who on June 21 wrote: 'Cutworms have been seriously destructive to my wheat crop. During the past six weeks 320 acres have been destroyed by these pests, summer fallow land in the best of condition. Alongside of this 200 acres of stubble land has also been destroyed.' It was found that the larvae of *Porosagrotis delorata* Sm. were responsible for the latter injury. This was the first record of the species as an injurious cutworm. The Redback cutworm *Euxoa ochrogaster* Gn. was one of the chief destructive species.

On account of the serious and widespread losses resulting from cutworm injuries, Mr. Arthur Gibson, Chief Assistant Entomologist, who for many years has made a special study of this group, has prepared an illustrated bulletin, which is now in the press, describing the various species of cutworms and army-worms and the methods of prevention and control.

CHINCH BUG (*Blissis leucopterus* Say.)

Although we have isolated records of the occurrence of this pest it has not been reported as seriously injurious in Canada, with the possible exception of an outbreak in Welland county, Ont., in 1908 when it injured late oats, until last summer (1911), when it was found seriously injuring timothy meadows in Middlesex county, Ont. Extensive damage was done in what appeared to be the centre of the infestation, blocks of grass several yards square being entirely killed out. As this is undoubtedly the most injurious insect affecting staple grains in North America, it is intended to make a careful investigation of the present outbreak with a view to preventing the spread of the insect to other sections.

THRIPS.

Reference was made in my report for 1910 to the widespread and, in some places, serious damage to cereals, particularly oats, by thrips, the sterile ears caused by their injury producing a characteristic 'silver top' appearance. Investigations on this insect were begun on the experimental seed plots of the Central Experimental Farm. A species of thrips was found and Dr. W. E. Hinds kindly confirmed my identification of this as the Grass Thrips, *Anaphothrips striatus* Osborn. A second species, *Euthrips nervosus* Uzel, was also found. A brief account of the first season's work on this species has been published (*Forty-Second Annual Report, Ent. Soc. of Ontario, 1900, pp. 63-65*). The blighted appearance is due to the larvæ and adult insects producing sterility in the ears by feeding on the flowers and ovaries. These injuries take place while the inflorescence is still in the leaf sheath. Counts were made of the ears rendered sterile by the thrips injuries. The most seriously injured variety of oats of those examined was 'Banner M'; nineteen heads of this variety had an average of 36·3 per cent of sterile ears. The least attacked was 'Abundance, Garton's Regenerated'; eleven heads of this gave an average of 17·3 per cent sterile ears. The maximum percentage of sterile ears in all the heads examined was 56·8 per cent in a head of 'Banner M.' The minimum percentage was found in a head of 'Banner H.' of which 3·5 per cent were sterile. The significance of these figures, as indicating the loss in the aggregate yield caused by the thrips, will be appreciated.

ROOT MAGGOTS.

From New Brunswick, Ontario and British Columbia reports were received concerning injuries of a serious nature, those of the Cabbage Root Maggot being the most common. Our experiments to test the efficacy of the various preventive measures were continued. On radishes the following substances were tried: Carbolic and soap emulsion, dry pyrethrum, dry pyrethum and flour, pyrethum decoction, dry hellebore, hellebore decoction. The same substances were used on onions and nitrate of soda was also tried in addition. The following preventives were tried on cabbages and cauliflowers: tarred felt-paper cards, carbolic and soap emulsion, dry hellebore, hellebore decoction, dry pyrethrum, pyrethrum and flour. In the case of cabbages and cauliflowers the season's experiments again showed the superiority of the tarred felt-paper discs over other preventives and in the case of radishes and onions the hellebore decoction using two ounces of hellebore to one gallon of water and watering the plants every seven or ten days, proved the most effective of the protective measures which were tried. Our experiments will be continued again during the coming summer and it is intended to collate the work of the several years for publication.

COLORADO POTATO BEETLE.

It is of interest to record that this insect, which a recent inquiry of the Commission of Conservation indicated as being the most widespread and destructive of farm pests, was attacked in Ontario during 1911 by a Pentatomid, *Perillus bioculatus* var. *claudus*.

3. INSECTS ATTACKING FRUIT TREES.

All of the more common fruit insects were again the subject of enquiries. It is most gratifying to note, however, that the increasing attention which is being given to spraying, resulting in the more common use of efficient power sprayers and the adoption of system in the application of spray solutions, is bringing about a very great improvement in certain sections.

Oyster-shell Scale (*Lepidosaphes ulmi*) is being controlled by lime-sulphur applied before the buds burst and while the trees are still dormant. Careful spraying is resulting in the production of apples of which 99 per cent are free from Codling Moth. The Bud Moth (*Tmetocera ocellana*) was responsible for considerable damage in Nova Scotia, New Brunswick, Quebec and Ontario. The absence of reliable data concerning this pest is responsible for much divergence in opinions as to the methods of control. On this account it is planned to commence studies of the life-history and control measures in eastern Canada during the coming season.

Through the co-operation of the Department of Agriculture of Ontario we were given a room in the Jordan Harbour Experiment Station which was used as a field laboratory, and Mr. R. C. Treherne made observations on a number of the more important fruit pests in the district. A brief report of the work has been published in the Annual Report of the Entomological Society of Ontario for 1911. Mr. Treherne found among other things that the Plum Curculio (*Conotrachelus nenuphar*) was responsible for a considerable dropping of both apples and plums and while its attacks might be of some benefit by causing a thinning out of the fruit, this thinning out would appear to be in excess of the requirements. In the first week in July, before the development of the second brood of the Codling Moth, 3,300 apples (on the trees) were examined by Mr. Treherne in the district between Jordan and St. Catharines, Ont., 15·06 per cent were found to be infested with the Curculio and 7·99 per cent were attacked by the Codling Moth. In the Ridgeway and Fort Erie districts out of 3,100 fruits, 6·8 per cent were infested with the Curculio and 7·4 per cent with Codling Moth.

In Nova Scotia and also in Ontario, the Green Fruit Worms (*Xylina* spp.) were destructive to the growing apples. Reports of injuries to apples by Capsid bugs were received from Ontario, Quebec and British Columbia. These insects attack the apples when they are small and their punctures retard the development of the fruit with the result that the apples bear marked depressions.

The Palmer Worm (*Ypsolophus pomotellus* Harris) was reported by Mr. L. Caesar from Ontario. The sporadic occurrence of this orchard pest, which has sometimes proved very serious, makes its record desirable.

In New Brunswick, Quebec and some sections of Ontario the Apple Maggot or Railroad Worm (*Rhagoletis pomonella*) was more than usually destructive where no steps were taken to control it by picking the fallen fruit. Mr. W. A. Ross, one of our field officers, commenced, while in the employ of the Ontario Department of Agriculture, a study of this pest and it is intended that he shall continue his studies during the coming summer when he will be located at our field station at Jordan Harbour, Ont.

Tent caterpillars, both the Forest Tent Caterpillar (*Malacosoma disstria*) and the American Tent Caterpillar (*M. americana*) were unusually abundant and destructive in New Brunswick, Quebec, Ontario and British Columbia. In orchards where the owners had not destroyed the newly formed webs or sprayed, the trees were entirely stripped, but their defoliation of orchards, however, was slight compared with the enormous devastation they affected on shade and forest trees. There did not appear to be any evidence of disease, nor were parasitic insects observed at work on the caterpillars. A number of the egg masses were collected in July by Mr. G. E.

Sanders but only a small percentage were found to be parasitised by such egg parasites as *Telenomus* spp. and *Pentarthron minutum*. At the present time the characteristic egg masses are abnormally abundant on the trees and everything points to an even more serious outbreak during the coming summer.

During the past two years we have found that larvæ of *Oberea tripunctata* have inflicted noticeable injuries to the twigs of apple in New Brunswick, the damage being quite conspicuous in some orchards.

INDIAN ORCHARDS.

An increase in the appropriation voted for the work in the Indian orchards by the Department of Indian Affairs, on whose behalf the care of the orchards in the Indian Reservations in British Columbia is undertaken, enabled us to employ our officer Mr. Tom Wilson in this work during the whole year. In previous years he was employed only from May to September inclusive and was unable, therefore, to carry on important and necessary work during the other months of the year. During the past year he devoted his whole time to the work, Mr. R. C. Treherne having been given charge of the inspection and fumigation of nursery stock imported into Canada *via* Vancouver. We were also enabled to supply a number of additional spray pumps for use in reserves hitherto without them or dependent upon other reserves for them. As a full report of the work will appear in the Annual Report of the Department of Indian Affairs, it is unnecessary to submit an additional report herewith.

4. INSECTS AFFECTING FOREST AND SHADE TREES.

The increasing attention which is being paid to insects injurious to shade and more especially forest trees in Canada was indicated by the increase in the number of enquiries addressed to the Division concerning them. Investigations on two of the most important forest insects, both defoliators were continued; the following are brief accounts of the same.

THE SPRUCE BUDWORM (*Tortrix fumiferana*).

As stated in my last annual report, arrangements were made for a study of the natural parasites of the species, with a view to foretelling, if possible, in conjunction with our field studies, the probable results of the outbreak which had assumed serious proportions in Quebec. Arrangements were made for supplies of spruce and balsam infested with the caterpillars to be sent to the Division from different regions in Quebec and British Columbia, and we are indebted to Mr. G. C. Piché, Chief Forestry Engineer of the Province of Quebec and to many lumber companies and private individuals for their assistance and co-operation in this matter and in sending in reports as to the depredations of the caterpillars. Mr. Sanders had charge of the breeding out of the parasites and the season's work had very valuable and interesting results. A number of new species of parasites were bred out of the material and descriptions have been published of the following species: a tachinid, *Winthemia fumiferanæ*, n. sp. (described by Mr. Tothill in *Can. Ent. Vol. 44, pp. 2-3*); six ichneumons, *Apanteles fumiferanæ*, n. sp.; *Conoblasta, fumiferanæ*, n. sp.; *Phygadeuon plesius*, n. sp.; *Epiurus innominatus*, n. sp.; *Mesochrorus diversicolor*, n. sp.; these have been described by Mr. H. L. Viereck of the United States Bureau of Entomology in *Proc. United States National Museum, Vol. 42, pp. 139-150.* There are, in addition, certain species whose identity is not certain. The results of our investigations, which will be subsequently published in full in the account of this insect, combined with observations in the field indicated that the extent and

intensity of the attack of the native parasites were such that the pest was being controlled in certain regions and would be controlled in others. Of all the parasites, those attacking the insect in the egg stage, the minute egg parasite *Penarthron minutum* was the most interesting and apparently the most effective. In a lot of eggs collected near Ottawa, 77 per cent of the eggs were parasitised and they contained an average number of over two parasites per egg. In 33 egg masses there were 370 eggs, 286 of these eggs were parasitised and produced 639 adult parasites. Similar heavy infestations of egg parasites were found in eggs collected at Maniwaki, P.Q.; 93 egg masses contained 1,192 eggs of which 902 or 75·6 per cent were parasitised, 2,167 parasites emerged or an average of 2·4 parasites per egg. With such a degree of egg parasitism natural control would appear to be assured, as it actually proved to be. In addition, the percentage of the larger ichneumon and other parasites was considerable. The devastation of the Spruce Budworm is spreading in an easterly direction and large numbers of anxious enquiries were addressed to the Division by lumber companies and private owners. As a result of our investigations on the parasites, we were able to give the assurance that the pest was becoming controlled before it had accomplished the destruction which was feared, and at our request a statement to that effect was issued to the press by the Commission of Conservation.

THE LARCH SAWFLY (*Nematus erichsonii*).

We have continued our studies of the parasites, both European and North American species, of this most destructive enemy of the native larch or tamarack. In view of the effective manner in which the parasites and other natural means of control are able to gain control of outbreaks of this species in Europe, particularly in England at the present time, attempts are being made to import from England the useful parasites and establish them in Canada, where as yet the native parasites affecting this species do not seem to be sufficiently numerous to obtain control before the insects' repeated depredations are fatal to the trees. As stated in my last report arrangements were made for the importation of cocoons of the sawfly from a locality in the English Lake district where the parasites had been abundant and effectual. The most abundant of these parasites and apparently the most important was an ichneumon which, since I first recorded it in 1908, has been referred to in all my writings, and by all those who have quoted the same, as *Mesoleius aulicus* Grav. Further study on the part of Mr. Claude Morley, an English authority on the British Ichneumons, has shown that this is a new species and the name *Mesoleius tenthredinis* has been given to it by Mr. Morley. Through the co-operation of the Manchester City Corporation Waterworks Committee, who own the Thirlmere estate in Cumberland, upon which the Larch Sawfly is being controlled by its natural enemies, we were enabled to have collected and sent to the Division a supply of cocoons from the locality in which 65 per cent of the cocoons had been infested with parasites in 1910. These cocoons were distributed in the following places: near Quebec City by Mr. G. C. Piché; at Point Platon, Que., by the late Mons. E. G. Joly de Lotbinière; in Algonquin Park, Ont., by the Superintendent, Mr. G. Bartlett, and at Ste. Agathe des Monts, Que. A small lot of cocoons was retained in the Division for study and a further batch was sent to Prof. R. H. Pettit, State Entomologist of Michigan. The disappearance of the sawflies in the locality in which the cocoons were collected had resulted in a considerable falling off in the percentage of cocoons infested with the ichneumon, *Mesoleius tenthredinis*. The cocoons retained in Ottawa showed a parasitism of 12·5 per cent and Prof. Pettit found that 7·05 per cent of the cocoons sent to him contained this parasite.

As the increase in the parasites and natural enemies of the sawfly is the only means whereby control of the pest will be gained, it is important that this increase should be obtained by such means as are possible. With a view to obtaining a larger

supply of the European parasites, particularly the ichneumon, *Mesoleius tenthredinis*. I visited the English Lake District in January, 1912, and succeeded in finding a locality where an examination of the hibernating larvæ indicated that a fairly high percentage of the sawfly larvæ were parasitised; from thirty to forty per cent of the larvæ appeared to contain the half-grown larvæ of the ichneumon parasite. Through the kindness of the owner of this locality, Sir William Ascroft, I was able to make arrangements for the collection of the infested cocoons. The collection of the cocoons was superintended by Mr. A. W. B. Edwards, Forester of the Manchester City Corporation Waterworks Committee, the chairman of which committee, Sir Bosdin T. Leech, most kindly assisted us in this work and for this help I wish to express our great indebtedness. I am now informed that, although the season has been unusually wet, ten seven-pound biscuit boxes of cocoons are being shipped to us. On their arrival they will be taken to the Riding Mountain Forest Reserve in Manitoba by Mr. Swaine, who will superintend their distribution in this reserve which marks the present western boundary of the spread of the insect. On account of the difficult conditions under which we are carrying on this work and the enormous extent of the infestation, covering as it does over 450,000 square miles, immediate results or even results appreciable for many years cannot, with the greatest optimism, be expected. We do know with certainty, however, that we are endeavouring to augment the only means by which control of this most serious enemy of the larch will be gained.

The Birch Leaf-Mining Sawfly (*Phlebatrophia mathesoni* Macgilliv.), which was referred to in my report for 1909-10 was extremely abundant in Nova Scotia and New Brunswick, but especially in the former province where the birch trees had the usual brown and withered appearance. In the same provinces and in eastern Canada generally the Larch Case-bearer (*Coleophora laricella*) was increasingly injurious; in some sections in Nova Scotia the larch trees or tamaracks over considerable areas had their leaves entirely destroyed and presented the characteristic light-brown appearance. The Bronze Birch Borer (*Agrilus anxius*) is continuing its destructive spread and is to be found now from Nova Scotia westward to Manitoba. It is particularly injurious to ornamental birches, especially the cut-leaved variety. Once it is noticed that a tree is attacked it is impossible to save it, as the boring larvæ have, by that time, spread through the wood of the branches, in some of which their presence may not be noticed externally. I regret to say that practically all the ornamental birches on the Central Experimental Farm are attacked and are now being killed and cut down one by one. The Maple Leaf-Cutter (*Paraclemensia acerifolliella* Fitch), whose appearance is somewhat sporadic, was prevalent in and reported from Quebec and Ontario. This species is readily distinguished by the characteristic circular and oval holes which the small caterpillars make by cutting pieces out of the leaves to form flat shelters. The Willow-leaf Beetle (*Galerucella decora*) was frequently reported from Manitoba injuring poplars and willows and occurred in enormous numbers in certain localities. Mr. Norman Criddle reported the beetles as being so numerous that the aspen poplars were actually bent down with the weight of the beetles upon them, and from a short distance whole bushes had a spotted grey appearance. An unusual outbreak of a geometrid, the caterpillar of which defoliated many thousands of acres of balsam in Newfoundland was reported to us by the Deputy Minister of Agriculture and Mines for that colony, and on investigation it was found that the insect was *Therina fiscellaria*, the caterpiller of which is one of the group generally known as 'span worms' or 'measuring worms.' The insect appeared to confine its attention to the balsam and the defoliated trees had a red appearance, apparently not unlike the depredations of the Spruce Budworm.

5. INSECTS AFFECTING DOMESTIC ANIMALS AND MAN.

Ticks.—The study of both our native ticks and those which are being introduced into Canada was continued. In these investigations we are particularly indebted to those veterinary inspectors of the department who are sending us specimens of such ticks as they may find in the course of their studies. Mr. J. W. Cockle, of Kaslo, B.C., has been indefatigable in his endeavours to send us specimens.

In view of the occurrence of the Rocky Mountain Spotted Fever Tick (*Dermacentor venustus* Bks.), in the States of Washington, Idaho, Montana, and other neighbouring States, where it has been shown to be the carrier of the organism of the Rocky Mountain Spotted Fever, an inquiry is being made as to its distribution in Canada. A single record of its occurrence at Kaslo, B.C., existed. A circular letter was sent out to western veterinary inspectors and secretaries of Farmers Institutes as a result of which we are now receiving specimens of ticks from different localities. We have found that *D. venustus* is fairly common in southern British Columbia and also that it is being brought in from Washington on imported live stock. This investigation is now in progress.

Sheep Maggots.—In certain regions in Europe the larvæ or maggots of the genus of flies known as *Lucilia* and also *Calliphora* are the cause of considerable injuries to sheep. A number of species of these flies occur in Canada and in order to discover whether their larvae were responsible for injuries to sheep an article was written on the subject and sent to the sheep breeders in Canada together with certain questions. The paucity of replies would indicate that sheep maggots are not a noticeable pest of sheep in Canada. This is due, I believe, to climatic conditions being unsuitable.

Warbles and Bots.—The account of the warble fly (*Hypoderma lineata*) published in my last report was responsible for a number of inquiries and a stimulating of interests in these pests and their control. Specimens of the Horse Bot (*Gastrophilus equi*) were received from Castor, Alta., and Moosejaw, Sask. Bot larvæ from deer were also received from British Columbia.

House Flies.—An important experiment on the range of flight of flies was carried out. This was in connection with an investigation which the Local Government Board of the British Government is carrying on on flies as carriers of infection and the results are being published. (*Rep. to the Local Government Board on Public Health and Medical Subjects. New series No. 66.*) The possible range of flight of flies is an important consideration in relation to the question of the possibility of their carrying disease germs and the proximity of their breeding places to human habitations. Flies which were reared in the laboratory were marked by means of an alcoholic solution of rosalic acid, a method of marking devised by Mr. G. E. Sanders who carried out the experiments. These flies were liberated on Porter's Island, an island in the Rideau river and in the centre of a well inhabited section of the city of Ottawa. Throughout the surrounding section of the city 'Tanglefoot' fly papers were distributed and afterwards collected and treated with a dilute alkaline solution which produced a brilliant red colouration from marked flies which were captured. Owing to numerous and in some cases extensive breeding grounds of house flies in the district flies were extremely abundant, which abundance naturally reduced the chances of marked flies being caught on fly-papers. Nearly 14,000 marked flies were liberated and 172 were recovered at various distances from the point of liberation. The furthest point at which a marked fly was captured was 700 yards (in a straight line) from the point of liberation. A full account of this investigation and also one which I carried out on the Lesser House-fly (*Fannia canicularis*) and the Latrine Fly (*F. scalaris*) is being given in the report already mentioned.

6. INSECTS AFFECTING GARDEN AND GREEN-HOUSE.

Beyond the insects concerning which inquiries are made year after year no exceptional records are to be noted and no special investigations on these insects were made. The Greenhouse Leaf-tyer (*Phlyctaenia ferrugalis*) was very injurious in certain sections to such plants as azalea, cyclamen and canna. The Black Vine weevil (*Otiorynchus sulcatus*) was responsible for considerable losses in certain greenhouses at Montreal, being particularly injurious to cyclamens. The Grape Vine Leaf-hopper (*Typhlocyba comes*) commonly wrongly called 'Thrips,' was again extremely injurious to Virginia Creeper and many inquiries were received concerning its control. Cutworms, the Tarnished Plant bug and Destructive Pea Aphis were all reported as injuring garden crops.

7. APICULTURE.

With a view to increasing the number of bee keepers in Canada and of assisting those who are desirous of beginning bee-keeping, a bulletin on apiculture has been prepared and, it is hoped, will be published shortly. As the most serious question affecting bee-keeping in Canada to-day is the spread of Foul Brood, this disease has been fully described and illustrated and the methods of treatment given in the bulletin. The provinces of Ontario, Quebec and British Columbia have legislation with a view to preventing the spread of Foul Brood within their territories and are endeavouring by means of apiary inspectors to deal with the situation. In British Columbia no foul brood exists, so far as can be ascertained at present, and it is to be hoped that its introduction will be prevented. A serious danger exists, however, in the possibility of the disease being introduced into the prairie provinces in colonies imported either from eastern Canada or from the United States, as Foul Brood occurs in all the States of the Union adjoining the international boundary; honey is also a serious means of introducing infection.

The Apiary.—The following is a report on the apiary which was managed by Mr. J. I. Beaulne.

Twenty colonies were removed from the bee cellar and placed on their summer stands on April 10 and 11. Their average weight when put into winter quarters in 1910 was 49½ lbs. and when brought out in the Spring of 1911 was 36 lbs., the average loss per colony being 12½ pounds.

Owing to the severe drought which began early in July the honey crop was not good. The dry weather and its serious effects on honey producing plants was generally responsible for a shortage in the crop with a consequent increase in the price of honey. The total amount of surplus taken from the bees during the season 1911 was 984 lbs., the yield of ten hives. These hives, therefore, gave an average yield of 84 lbs., which was satisfactory under the adverse circumstances.

Thirty colonies were carried into winter quarters on November 13, 1911, the average weight of the colonies being 47 lbs. At the time of writing the bees are wintering well.

8. MISCELLANEOUS.

Collections.—As usual we have named a large number of collections of insects for private individuals and teaching institutions, full use is therefore, being made of the collection of insects in the Division. It is our aim that this collection shall ultimately become a national collection of the insects of Canada, for such it is virtually at present. During the last year the arrangement of several of the orders

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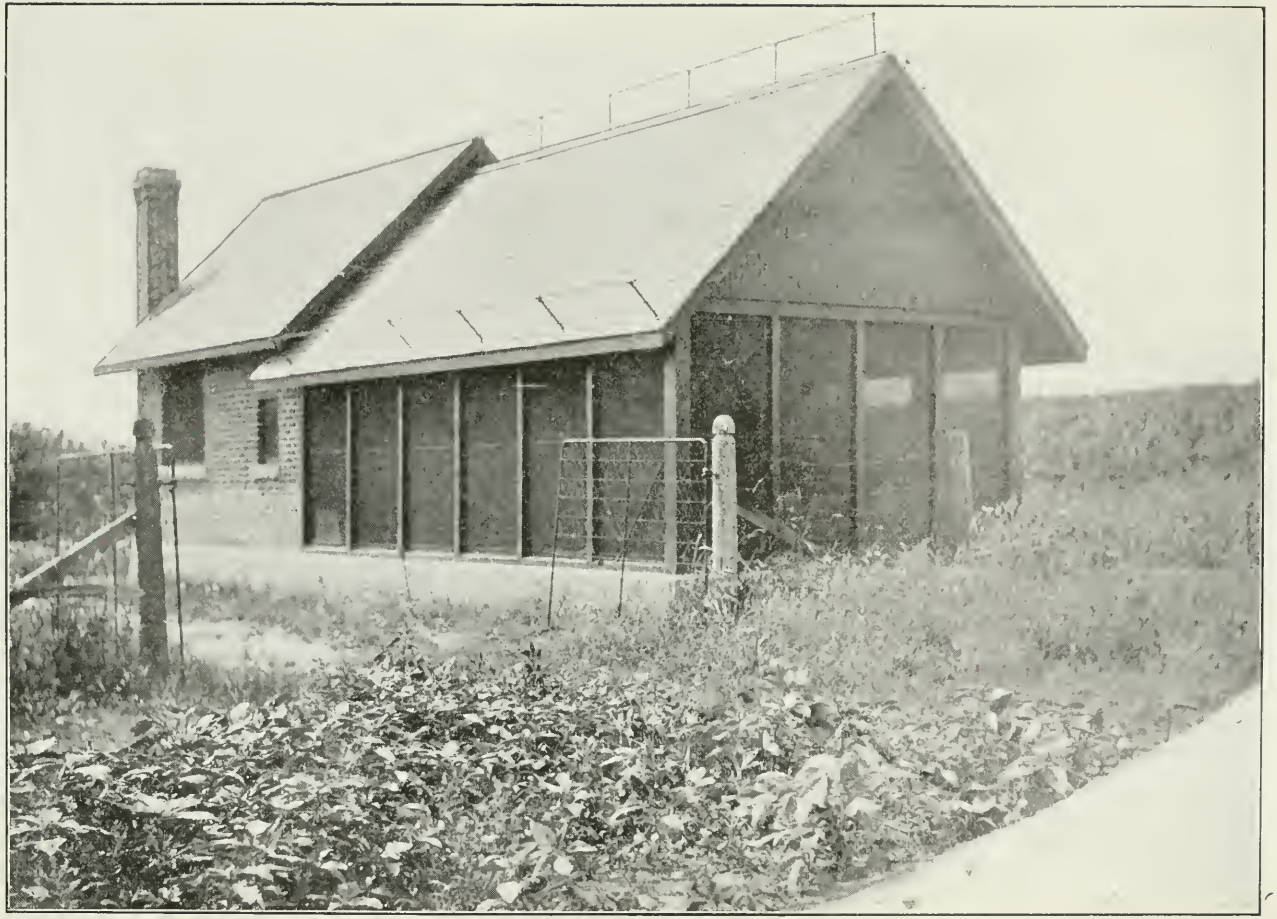

The Insectary, Central Farm.

has been started: the Lepidoptera are now almost in order and progress will be made with the other orders as opportunity and accommodation permit. It gives me great pleasure to acknowledge our indebtedness to Dr. L. O. Howard, Chief of the United States Bureau of Entomology and his scientific assistants in the Bureau and in the National Museum at Washington for their continued assistance in naming entomological material for us; to all other specialists who have assisted us in a similar manner I wish to extend our most cordial thanks.

Exhibits of injurious insects have been sent to Provincial exhibitions at St. John, N.B., and Quebec. By request a special exhibit illustrating the relation of house-flies to public health was made at the Canadian National Exhibition at Toronto in September and the same was exhibited later at the Central Canada Exhibition, Ottawa. Lack of space prevents the arranging in the Division of a permanent public exhibit of injurious and useful insects which would render our collections increasingly useful to farmers and the public generally. It is hoped, however, that this may be remedied in the near future.

Correspondence.—The number of letters received from April 1, 1911, to March 31, 1912, was 3,993, and the number of letters sent out during the same period was 5,465, compared with 2,476 letters received and 3,845 sent out during the previous fiscal year.

Travelling.—The following is a brief account of the journeys which were made by me during the year in connection with the work of the Division. On April 12 I left for Washington, D.C., and remained there until April 19 studying the organization and methods of work in the Bureau of Entomology of the U. S. Department of Agriculture. The extent of their operations and investigations may be gathered from the fact that the appropriation for the Bureau of Entomology for the fiscal year 1911-12, was $601,920. The great kindness which Dr. Howard and his associates extended to me and the large amount of information which I was able to collect made my visit not only of extreme value but most enjoyable. I returned to Ottawa by way of Boston, where I visited the Gipsy Moth Parasite Laboratory at Melrose Highlands for the purpose of discussing the parasitic work and the possibilities of importing parasites of the Brown-tail Moth into Canada. I reached Ottawa on April 24. On April 28, I visited London, Ont., where I gave an illustrated address to the Women's Canadian Club on 'House-flies in relation to Public Health.' A number of addresses on the same subject were delivered in Ottawa. The educational work on the dangers of the house-fly and its control which has been carried on during the last two years is now resulting in active steps being taken to control the pest in many of our cities. On May 30, I left Ottawa for Nova Scotia and inspected the work which was being carried on against the Brown-tail Moth, going as far west in the province as Weymouth. I returned to Ottawa on June 8. Two visits were made to Toronto in August and September, on the latter occasion to give an address at the Canadian National Exhibition. New Brunswick was visited in September, leaving Ottawa on September 10. I reached Fredericton, N.B., on the 11th and conferred with the Provincial Department of Agriculture in reference to the Brown-tail Moth and other work. The next two days were spent visiting the infested territory in Charlotte County. On September 14 I visited St. John, N.B., and crossed to Nova Scotia on the 15th, returning to Ottawa via Truro, N.S. On November 8 by invitation of the Department of Agriculture of Quebec I addressed the Quebec Bee-keepers Association at Montreal on 'Bee Diseases and their Treatment.' The meetings of the Fruit Growers' Association and Bee-keepers' Association of Ontario were attended at Toronto on November 15 and 16, and addresses were delivered at each. The annual meeting of the Entomological Society of Ontario was held at Guelph on November 23 and 24, where I gave the public address and read one or two papers; Mr. Gibson also attended the meetings and contributed papers. On December 13

I left Ottawa for England, sailing from Halifax on December 16. During my visit to England I conferred with Mr. Guy Marshall, Scientific Secretary of the Entomological Research Committee of the Colonial Office (Dec. 29), Dr. Stewart MacDougall, Edinburgh University, Entomological advisor to the Board of Agriculture, and Dr. Shipley, Master of Christs College, Cambridge, in reference to a scheme which the Right Hon. the Secretary of State for the Colonies had submitted for our consideration, in reference to Imperial co-operation for the purpose of preventing the spread of insect pests within the Empire. A conference was held at the Colonial Office on January 17 when the proposed scheme was outlined to me. On January 16 and again on January 23 conferences were held at the Board of Agriculture, when the question of legislation governing the inspection of nursery stock and the inspection of English nurseries exporting stock to Canada were discussed with Mr. T. H. Middleton, Asst. Secretary, and Mr. A. G. L. Rogers. I also had the pleasure of discussing these and other matters with the President of the Board of Agriculture on January 23. I am pleased to say that the Board of Agriculture have arranged for the inspection of English nurseries and for the issuing of nursery certificates. I spent January 3 to 8 in the English Lake District seeking a suitable locality for the collection of cocoons of the Larch Sawfly containing parasites, to which work I have already referred. I conferred with Sir Bosdin Leech, the Chairman of the Manchester Waterworks Committee, which owns the Thirlmere Estate, on January 2 and he most kindly promised his co-operation in the matter of collecting and shipping the parasitised cocoons. Two lectures were also delivered in England on January 9 and 24. I sailed from Liverpool on January 26 and reached Ottawa on February 5, by way of Halifax, where the Brown-tail Moth work was discussed with Mr. Sanders and Prof. Cumming. The meetings of the Canadian Forestry Association were attended on February 7 and 8 and a short address on our work was given. The Dominion Fruit Convention held in Ottawa February 14-16 was attended. On March 22 I gave an illustrated lecture on Forest Insects at Queens University, Kingston, Ont., and also delivered an address (illustrated) at the annual meeting of the Quebec Society for the Protection of Plants held at Macdonald College, Que., on March 27.

Publications.—The following is a list of papers, articles, etc., written by the officers of this Division and published during the year 1911:—

C. Gordon Hewitt—

'Warbles on Cattle.' *Census and Statistics Monthly, Dept. of Agriculture, Canada, Vol. 4, pp. 118-119.*—1911.

'The more Injurious Insects of the Year 1910.' *Forty-first Ann. Rep. Ent. Soc. Ont., pp. 27-29.*

'Some Observations on the Practical Importance of Parasitic Insects.' *Forty-first Ann. Rep. Ent. Soc. of Ont., pp. 63-64.*—1911.

'Notes on Insect Pests—The June Beetle and Tent Caterpillars.' *Census and Statistics Monthly, Dept. Agr., Canada, Vol. 4, pp. 146-148.*—1911.

'The House-fly in Relation to Public Health.' *Public Health Journal, Vol. 2, pp. 259-261.*—1911

'The Destructitve Insect and Pest Act and Regulations issued thereunder.' *Div. Ent. Bull. No. 1. Bull. No. 7, Second Series, Experimental Farms, Dept. Agriculture, Canada.*—1911.

'The Spruce Budworm and Larch Sawfly.' *Rep. Canadian Forestry Ass., pp. 107-113. 1 map.* 1911.

'The Preparation of a Catalogue of the Insects of Canada.' *Canadian Entomologist, Vol. 43, pp. 273-275.*—1911.

'The Teaching of Insect Life and its Practical Importance.' *Ottawa Naturalist, Vol. 25, pp. 63-67.*—1911.

'The Hessian Fly.' *Census and Statistics Monthly, Vol 14, pp. 201-203.*—1911.

'On *Coelopisthia nematicida* Pack. A chalcid parasite of the Large Larch Sawfly, *Lygaeonematus erichsonii* Hartig.' *Canadian Entomologist, Vol. 43, pp. 297-303, 4 figs.*—1911.

'The Chinch Bug.' *Census and Statistics Monthly, Vol. 4, pp. 231-233.*—1911.

'Daniel William Coquillett' and other reviews in the *Canadian Entomologist, Vol. 43.*

'The Sheep Maggot Fly.' *Census and Statistics Monthly, Vol. 4, pp. 323-324.*

'Report of the Dominion Entomologist.' *Ann. Rep. Experimental Farms, Dept. of Agriculture, Canada, pp. 207-235, 3 figs; 3 pls.*

Arthur Gibson—

'The Preparatory Stages of *Phragmatobia assimilans*, var. *franconia* Sloss.' *Can. Ent., Vol. 43, pp. 125-128.*—1911.

'Insects of the Year in the Ottawa District.' *Forty-first Ann. Rep. Ent. Soc. Ont., pp. 11-15.*—1911.

'Basswood or Linden Insects, IV.' *Forty-first Ann. Rep. Ent. Soc. Ont., pp. 99-101.*—1911.

'The Entomological Record for 1910.' *Forty-first Ann. Rep. Ent. Soc. Ont., pp. 101-120.*—1911.

'Studies on the Life-histories of Canadian Noctuidæ: I. *Monima revicta.*' *Can. Ent., Vol. 43, pp. 157-159.*—1911.

'Some Seed-infesting Insects.' *Ont. Agric. College Review, May, 1911, 3 pp.*

'Two Classes of Injurious Insects: Cutworms and Plant Lice.' *Ottawa Horticulturist, May, 1911.*

'The Luna Moth.' *Ottawa Naturalist, Vol. 25, pp. 81-83.*—1911.

'Fauna Ottawaensis: Order Lepidoptera, Super-family Geometroidea.' *Ottawa Naturalist, Vol. 25, pp. 105-112.*—1911.

'Abundance of the Cotton Moth in Ontario.' *Ottawa Naturalist, Vol. XXV., Dec.*—1911.

R. C. Treherne—

'Insects of the Year in the Niagara District.' *Forty-first Ann. Rep. Ent. Soc. Ont., pp. 19-21.*—1911.

G. E. Sanders—

'Notes on the Breeding of *Tropidopria conica* Fabr.' *Can. Ent., Vol. 43, pp. 48-50, 1 fig.*—1911.

Library.—By exchange and purchase we have increased the number of entomological and agricultural journals and publications. I wish especially to thank the Hon. Walter Rothschild for '*Novitates Zoologicae.*' We are also indebted to the respective institutions for the following publications which have been added during the year: *Arkiv fur Zoologi; Reports Michigan Academy of Science; Bulletin of the Wisconsin Natural History Society.* To all those institutions and individuals who have exchanged publications with us our sincere thanks are due. The library is still sadly deficient in a number of standard works on systematic entomology and we are obtaining these as our funds permit. A complete library is essential to the best work.

STAFF.

The great increase in the work of the Division and more especially the urgent need for further extension of the study and control of injurious insects in Canada has led to a number of important additions to the staff of the Division during the past year.

Mr. J. M. Swaine, M.Sc., has been appointed Assistant Entomologist to take charge of forest insects. Mr. Swaine is a native of Nova Scotia and after studying at the Provincial Agricultural College, Truro, N.S., he was employed for several years in teaching. His entomological inclinations took him to Cornell University, Ithaca, where he specialized in entomology and graduated (B.S.A.) in 1905. In the following year he obtained his degree of Master of Science and continued his post graduate studies on the staff of the Entomological Department until 1907, when he was appointed Lecturer in Entomology and Zoology at Macdonald College, P.Q., which position he held at the time of his appointment to the Division. He has made a special study of forest insects but particularly the *Ipidæ* (*Scolytidæ*) or Bark-beetles, the most injurious of all our forest insects. A number of valuable papers on this group have been published by him, the chief of which being his '*Catalogue of the described Scolytidæ of America North of Mexico.*' (*85 pp., 17 plates, 1909.*) Mr. Swaine's appointment has very materially strengthened the staff of the Division and the virgin field to which he is now devoting his attention will afford him unequalled opportunities of carrying on work of the greatest value in its bearing on the conservation of our forest wealth.

Mr. J. D. Tothill, B.S.A., has been appointed field officer of the Division. Mr. Tothill specialized in entomology at the Ontario Agricultural College and was subsequently employed by the Bureau of Entomology of the United States Department of Agriculture in the Gipsy Moth Parasite Laboratory at Melrose Highlands, Mass., where he had charge of the work on dipterous parasites.

Mr. Germain Beaulieu, LL.B., a member of the Bar of the province of Quebec, was appointed a field officer of the Division, and his intimate knowledge of the insects of the province of Quebec in particular make his services of great value to the Division.

Mr. W. A. Ross, B.S.A., was appointed field officer during the summer of 1911. Previous to his appointment he had been employed by the Ontario Department of Agriculture in an investigation on the Apple Maggot, which investigation he will continue during the coming season.

During my absence from the Division, my Chief Assistant, Mr. Gibson, has had charge of the work, and in addition to assisting in the work of the Division he has also superintended the work connected with the inspection and fumigation of imported nursery stock. I wish to gratefully acknowledge his assistance in carrying on our work. My sincere thanks are due to the loyal assistance of all my other officers and to my secretaries, Mr. J. A. Letourneau and Miss J. McInnes for the conscientious manner in which they have carried out their duties.

INSECTARY.

The experimental work of the Division carried on at Ottawa has been severely restricted in the past by the lack of accommodation. The small greenhouse used for the work was wholly unsuitable and in fact almost nonhabitable in the summer, despite all efforts to keep it cool, owing to the high temperature. Plans were accordingly made for an 'open air' insectary and this has been erected during the past year (Plate V.). It consists of a work-room 12 feet by 15 feet and the insectary proper which measures 21 feet by 12 feet. The work-room contains a dark room and is separated from the insectary by a safety door. The sides of the insectary are

composed of wire screens which may be removed during the winter for storage, leaving the insectary open. Two open wells in the concrete floor of the insectary permit the planting of food plants and the burial of overwintering material. The bronze wire screening has thirty-six meshes to one inch and is as fine as would appear to be necessary and practicable. The roof of the insectary has a good pitch and provision has been made for covering it with sailcloth, leaving an air space of one foot in depth, should it be found necessary on account of unusual heat.

A small plot of ground surrounding the insectary and greenhouse has been allotted to the Division for experimental purposes.

The development of our studies of useful and injurious insects in their varied relations to man's industry and welfare is meeting with demands for their further extension. The ever increasing struggle against insect pests on the part of the farmer, the fruit grower, the forester, the stock raiser and everyman, results in a greater necessity for fuller information with regard to such pests and their control. This struggle is greater in a young country such as ours than in an old established country, and while the productivity of large areas may attract attention there is another side to the picture which the depredations of insect pests brings into view: the devasted, or twice and sometimes thrice sown grain fields or root crops and the defoliated forest, country-side or orchard. These are some of the problems which the entomologist is called upon to solve.

I have the honour to be, sir,
Your obedient servant,

C. GORDON HEWITT,
Dominion Entomologist.

REPORT OF THE DOMINION BOTANIST

H. T. GÜSSOW.

OTTAWA, March 31, 1912

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith the third report of the Division of Botany, which is an account of some of the work carried on during the year from April 1st, 1911, to March 31st, 1912.

The number of enquiries received from farmers throughout the Dominion has considerably increased, so that very little time remained to carry on original researches into many important problems. Progress is, however, being made in some directions, as far as time and opportunity permit, but it is felt that the daily routine and executive work connected with the large correspondence and number of inquiries restrict more important and necessary investigations, which it is my opinion should receive the main attention of the staff of the Division.

There exists practically in every province certain pressing needs which come within the scope of work of this Division, and which should be attentively investigated to prevent the spreading of diseases or weeds, as the case may be.

Although it would be difficult to outline the work of each individual member of the staff during the year, it will be apparent that we were all working under high pressure since over 300 cases of disease were studied and nearly 1,000 plants identified, described and reported upon.

The systematic work i.e. the collecting and classifying of fungi and higher plants made very satisfactory progress. In the Botanic Gardens considerable new work was begun concerning the representation of the district flora and the collecting of seeds of trees, shrubs and other plants for exchange with other botanic gardens and institutions. Much time was devoted to the correct labelling of many trees and shrubs, all labels having been specially prepared and written in large type during the winter months by my foreman, Mr. Franz Horn, whose skill and careful work in this and other connections is much appreciated.

There have been maintained a large number of experimental plots exhibiting fodder grasses and plants, a series of clover and alfalfa variety tests, and the plots of broom corn under the charge of Mr. B. Nothnagel, who through many years of experience has shown himself a careful and reliable observer. During the winter months the services of this officer are much in demand by other Divisions, as semi-official translator of letters written in at least six foreign (mainly Slavonic) languages.

The field experiments on diseases affecting fruit-trees, grain, potatoes and other kinds of vegetation have also been in charge of this officer under my personal direction.

The vacancy created by the resignation of Mr. Herbert Groh was filled by Miss Faith Fyles, B.A., who has charge of all the work connected with the Botanic Gardens,

Herbarium, identification and collection of plants and such experiments as come within the scope of systematic botany. Miss Fyles has also shown herself to be an expert artist, and her skill in this connection has been much in requisition and has been found very useful in all phases of work of this division.

The Chief Assistantship is held by Mr. J. W. Eastham, B.Sc., who devotes as much of his time as possible to experiments in connection with the cause and control of plant diseases. His experience and careful observation will no doubt lead him soon to valuable results in some of his work. He has also charge of the cryptogamic herbarium and collection. To all these officers, including Miss Fairbairn who is in charge of the correspondence, library and records, I express herewith my appreciation for the ready help upon which I could count at all times, and without which the work of the Division would have been slow in progress.

I have the honour to be, sir,
Your obedient servant,

H. T. GÜSSOW,
Dominion Botanist.

Helminthosporium disease of Barley. *a.* Attacked ear remaining in leaf sheath. *b.* Spotted leaves. *c.* Spotted grains. *d.* Portions of aborted ear. *e.* Small, shrivelled grain, result of an attack.

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PLANT PATHOLOGY.

THE EFFECT UPON VEGETATION OF WATER TREATED WITH HYPOCHLORITE OF LIME AGAINST TYPHOID FEVER.

During typhoid epidemics the water supply of cities is temporarily treated with Hypochlorite of Lime in order to destroy the active typhoid bacilli in the water and thus prevent the spreading of this disease by means of impure water.

Coincidentally with this practice, nurserymen and others using this treated water for their greenhouse and other plants, stated that they noticed a peculiar failing in the vigour of their plants, and thus were anxious to obtain advice whether this water may be injurious to plant life. Considering the great germicidal properties of this preparation, it was thought probable that injury might also result to higher plants from its use.

For this purpose the Dominion Chemist, Mr. F. T. Shutt, M.A., and myself began a series of experiments in February, 1911, which were continued with a view of disclosing any facts bearing on the subject.

We obtained a number of plants which were suspected to be failing in health owing to their being treated with chlorinated water. Three plants of Carnations and three of Hybrid Roses of this kind were subjected to the following treatment:—

1. Potted into new soil, watered as required with snow water only.

2. Potted into new soil, watered as required with chlorinated water (0·26 p.p.m. available chlorine).

3. Potted into new soil, watered as required with chlorinated water, but boiled for fifteen minutes.

4. Potted into new soil, watered as required with chlorinated water plus 1 lb. of soot per 3 gallons of water.

5. Roses grown on the Farm used as check plants treated in the same manner with chlorinated water.

The plants were very carefully watched and kept under the same condition of temperature and culture. After three months had elapsed no difference whatever could be noticed in any of the plants. The roses blossomed freely throughout, the carnations, however, hardly recovered, having been transplanted while practically in flower. The check plants subjected to the different modes of treatment showed not the slightest signs of any injury.

Another experiment was conducted to test the effect of chlorinated water on the germination of seeds. Various strengths ranging from 0·05 to 10 parts per million of available chlorine were used. Six varieties of wheat were employed, the seed being soaked in the freshly made-up solutions, and an equal number in distilled water. (Time 12 hours.)

All samples were sown on the same day. Germination was found to be uniform throughout; no influence could be observed on the energy of germination or in the development of the young plants. Later on, a series of experiments was started with barley and oats without any sign of injury, or even retardation. The plants were grown until in flower, when the earth was washed away and the plants, root and all, were carefully dried in the air and then weighed. Although slight differences in weight between plants of the same series occurred, such did not indicate that there had been any injurious influence exerted by the chlorinated water.

Radishes, turnips, cucumbers and beans were also subjected to treatment in the same way. The cucumber plants treated with chlorinated water showed rather a more vigorous growth than those receiving snow water only. Geraniums behaved absolutely identically when treated with melted snow water and that containing Hypochlorite of Lime.

Without going into further details, Mr. Shutt and the writer, as a result of this investigation, conclude that the water supplies, as ordinarily treated with Hypochlorite of Lime have no injurious effect, direct or indirect, upon cultivated plants.

SOME DISEASES OF CEREALS.

(See Plate VI.)

Not uncommonly, there is found on the cultivated barley a disease known by the names of 'yellow leaf,' 'early blight' and 'leaf-stripe.' The last name is especially appropriate since the disease in its earlier stages takes the form of very conspicuous, elongated, yellowish-green spots, more or less sharply bounded by the veins of the leaf and frequently extending for the greater part of its length. Later, the spots turn brown, the attacked leaves die, and, owing to the loss of leaf tissue, the yield may be appreciably reduced. This disease is due to the fungus *Helminthosporium gramineum* Rabh., the spores of which may usually be found in abundance on the discoloured areas.

During the past season, there was observed on some of the barley plots at the Experimental Farm a disease due to a closely-related species of *Helminthosporium*. In this case, however, the leaf injury instead of appearing in the form of the stripe-like discolourations just described, shows as small, usually elongated spots, dark brown in colour, but often with a paler border. These spots are frequently so excessively abundant as to cause the total browning and shrivelling of the leaf. The disease is apparently much more severe on the leaves than that due to *H. gramineum* Rabh. and it also appears to affect the ears to a greater extent

Enquiry showed that the occurrence of a similar disease had been recorded in the State of Iowa, U.S.A., and described by Prof. Pammel et al. in Bulletin 116 of the Iowa Expt. Station. It was found to be due to a species of *Helminthosporium* considered by the authors to be one hitherto undescribed and provisionally named by them *H. sativum*.

Comparison of the symptoms of the disease as it occurred at Ottawa with the published description of the one observed and described by Prof. Pammel seemed to leave no doubt that the two were the same. For confirmation, however, specimens were sent to Prof. Pammel who pronounced the disease to be identical with the one described by him. Its occurrence at Ottawa is, therefore, of sufficient interest to be worthy of record apart from the possibility of its becoming a serious pest of the barley crop.

Control.—Both the diseases just mentioned are carried over from year to year by infected seed. Since, however, the fungus is actually within the grain as mycelium and not merely adhering to the surface in the form of spores, treatment of the seed with formaldehyde as practised for such diseases as stinking smut of wheat and covered smut of barley would not be of any value. The only treatment that has been found satisfactory as yet is the hot water one, used for controlling loose smuts of barley and wheat, which is somewhat difficult to carry out satisfactorily under ordinary farm conditions.

Leaf Spot of Wheat (*Septoria tritici* Desm.) was noticed in the neighbourhood of the Farm and specimens were also sent in from Saskatchewan. In no case, however, was it causing serious injury.

CONTINUED OBSERVATIONS ON FROSTED WHEAT.

In a short paragraph appearing in last year's report (p. 240) reference was made to the effect of frost on wheat. It was pointed out that frost may injure the grain more or less while the wheat is standing in sheaves, being then often in a 'dough' or 'milky' stage and compelled to dry up without the aid of the roots of the still active plant. The statement was made that the injury to grain was less when the frost attacked the uncut grain. It was inferred that frost will thus reduce the energy of germination, which would result in an uneven stand and subsequent un-

evenness in ripening. Unevenness in ripening may be due to other factors as well, but from repeated observations and experiments conducted this year certain important conclusions may be drawn supporting this claim.

Two samples of frozen wheat were secured for experimental purposes. Both samples originated from the same field, but they were remarkably different in appearance. Sample 1 was very dark and much shrivelled, sample 2 was much plumper, but still showed signs of frost injury.

A series of grains of both samples were weighed.

Sample 1, 1,000 grain (average) weight = 21.050 grammes.*
" 2, 1,000 " " " = 30,990 "

Both samples had received identical treatment and were then practically equal as regards degree of moisture.

GERMINATION AND DEVELOPMENT OF SAMPLES (AVERAGE OF THREE TESTS).

Sample.	Sown.	Germination after 6 days.	Germination after 20 days.	Height of plants. July 22.	Date of flowering. Anthers showing.	Ripening of grain Full Ripe.
1	Jan. 22	41%	78.5%	14 inch.	Apl. 27—May 3.	May 28.
2	"	72%	95%	21 "	Apl. 17—Apl. 24.	May 20.

The grain was grown in the experimental greenhouses under identical conditions. The degree of development in both plants grown from the different seeds also tends to show that unevenness in ripening has in this case been due to the frost. It must be realized, however, that, under field conditions, both samples would be sown together, when it is possible that some of the weaker plants might succumb in the struggle for existence, but it is doubtful whether such conditions would entirely eliminate the considerable difference in flowering and ripening. At any rate we would advise the farmers not to cut their grain prematurely even though frost may seem imminent. A little careful attention to the lessons from these observations will no doubt result in preventing to a large extent an uneven stand of wheat in the field.

ILLEGAL TO USE, FOR SEED PURPOSES, POTATOES IMPORTED FROM EUROPE.

The potato harvest of the Dominion in 1911 was considerably below the mark, and as a consequence importations of potatoes from abroad became a universal practice. The total imports of potatoes into Canada from European countries during the year ending March 31, 1911, was 720 bushels. But from October 1, 1911, to March 31, 1912, as many as 200,000 bushels and more have been imported into Canada from Europe. It has been repeatedly pointed out that there exist in several European countries potato diseases new to this country, and owing to the fact that Liverpool is practically the centre of the exportations, and incidentally the centre of a badly infected area, the importation together with the potatoes of one or more diseases into Canada became very probable. The general prohibition of the importation of potatoes from Europe would have been advisable under ordinary circumstances, but partly because our crop was deplorably short, and partly because the imported potatoes were primarily intended for consumption, the question of prohibiting the entire importa-

* 1 oz.=approx. 28 grammes.

tions, though carefully considered, was decided to be inadvisable. But when the planting season approached and inquiries concerning the use for seed of imported potatoes became more and more numerous, it was realized at once that the planting of diseased imported tubers would almost certainly be the means of establishing the one or the other of these undesirable diseases. For this reason the following order in council was passed without delay: 'It shall be illegal to sell, offer for sale, dispose of in any way, receive or use, for seed purposes, any potatoes imported from Europe.'

The use for seed of such potatoes has been prohibited mainly because of the danger of introducing into the Canadian soil two new potato diseases, Potato Canker (*Chrysophlyctis endobiotica* Schilb.), and Corky Scab (*Spongospora subterranea* Johns) (Figure 2). The former of these two diseases has been actually discovered in a shipment from England. Hence, it will be obvious that the repeated warnings have been necessary. Besides, experiments have shown that in our climate and soil European potatoes do not yield satisfactorily. We reproduce herewith photographs of diseased tubers taken from the affected carload of potatoes imported into Canada, showing plainly the peculiar warty outgrowths from the neighbourhood of

Fig. 1.—Ordinary Potato Scab, (*Oospora scabies* Thaxter).

the eye or eyes so characteristic of Potato Canker. Much attention is necessary to establish the identity of the disease in this condition. We have examined a large number of tubers where the primary shoots growing from the eyes have become crushed and mutilated, resembling very closely the appearance of canker. Here microscopical evidence only can reveal the true nature of these growths. This being out of the question where farmers are concerned, from whom one cannot expect the necessary technical knowledge to determine accurately the nature of the trouble, the prohibition of the use of imported tubers for seed purposes became the only alternative. To facilitate this precaution, the following order was also passed by Order in Council:—

'Every person using for seed other potatoes than such as have been raised by himself must obtain, preserve and exhibit on demand, previous to planting, a certificate from the seller or his agent stating that the potatoes to be used for seed have not been imported from Europe.'

The following provisions have been copied from the Destructive Insect and Pest Act and should be carefully studied, as any farmer or grower on whose land this Potato Canker or any Corky Scab disease is subsequently found will be asked to furnish evidence of the origin of the potatoes used for seed. Anybody found to have contravened the Act or any regulation will not only render himself liable to a fine or imprisonment provided under the Act, but will also forfeit the entire crop without any compensation.

'Compensation not exceeding two-thirds of the value as assessed by the inspector, of the vegetation or vegetable matter or containers thereof destroyed by the instruction of an inspector, shall be granted by the Governor in Council upon the recommendation of the Minister, except in cases where these regulations are carried out under the direction of the government of a province not granting compensation, or in the case of potatoes or potato crops.'

'Every person who contravenes any provision of this Act or any regulation made thereunder, shall be liable, upon summary conviction, to a fine not exceeding one hundred dollars, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment. Any vegetable matter imported or brought into Canada contrary to this Act, or to any regulation made thereunder, shall be forfeited to the Crown.'

'The owner, occupier or lessee of any premises or place where any of the insects, pests or diseases specified herein shall be found, shall immediately notify the minister, and shall also send to him specimens of such insects, pests or diseases.'

Any one desiring further information about this Potato Canker is referred to Bulletin 63 of the Experimental Farm series (Division of Botany), and Farmers' Circular No. 1, obtainable free of charge from the Experimental Farm, Ottawa.

"CORKY" SCAB OF POTATOES.

(*Spongospora subterranea* Johns.)

No record regarding the occurrence of this disease on this side of the Atlantic has become known up to date of writing. Although the disease has part of its name in common with the ordinary potato scab it is in no way related, nor does it even closely resemble the common potato scab. Probably the name 'Powdery Scab,' given to it later, describes more closely the appearance of this trouble. The 'scabs' or incrustations on the surface of potatoes in this disease are filled with a powdery, olive-green mass, composed entirely of the spores of the fungus, *Spongospora*. They are often present in such dense masses as to appear like the spore powder of smut fungi. The common potato scab (Fig. 1) does not alter the shape of the tuber, whereas the powdery scab (Fig. 2) frequently produces gnarled, knobby tubers covered with deep sores, almost totally unfit for any purpose. The fungus, or more correctly speaking, the slime fungus (*Myxomycete*) belongs to the same group of organisms as that causing Club Root (*Plasmodiophora*) in turnips and other related plants. It produces millions of perforated spores which infest the soil and any sound tubers that may come into contact with diseased ones. The disease is widely spread in Europe, hence it affords one more reason to abstain from using imported potatoes for seed purposes. The great danger of introducing new diseases into any country should be fully realized. The examples afforded by the ravages of the Late Blight of potatoes (*Phytophthora infestans*), which disease has also been introduced from abroad, should suffice to impress any sceptical person of its serious importance and the responsibility of any grower who commits 'an error of judgment.' To spray potatoes, as they should be sprayed, to prevent any losses from Late Blight, costs, inclusive of labour and material, twenty-four dollar per statute acre. This expenditure, however, may save every cent of loss, while spraying to prevent Potato Canker and Corky Scab has been found of no value whatever.

A large quantity of imported tubers have been examined. While it must be said that some were of remarkably fine quality, there were whole consignments that showed Dry Rot, Rhizoctonia, Scab, Late Blight, Sprain and Bacterial Rots to such an extent as to be useless for any purpose.

Fig. 2.—Powdery or corky scab Disease of Potatoes (*Spongospora subterranea* Johns.) Potatoes all out of shape, gnarled and covered with sores.

The risks involved from the introduction of new diseases are far more serious than may appear. It is not a question of injuring the crops and purses of one or more growers, but the whole industry of a nation may be seriously compromised. The sooner this question receives international attention the better, for only by international agreement will it be possible to prevent the wholesale exportation of diseased vegetation, and thus the distribution all the world over of diseases against which every country spends thousands of dollars annually in its efforts of control, but which it shows no concern about when exporting into any other country.

'RHIZOCTONIA' DISEASE OF POTATOES.

(*Corticium vagum* B. & C. var. *Solani* Burt.)

(Figure 3.)

Very frequently there may be found firmly adhering to the surface of potato tubers, small, dark-brown bodies of varying form, and ranging in size from a pin's head up to $\frac{1}{8}$ of an inch or so in diameter. They are usually comparatively inconspicuous when dry, but on wetting the surface of the tuber they show up distinctly. These bodies are masses of resting mycelium—commonly, but in this case, perhaps, not quite correctly, termed *sclerotia*—of a fungus. Under the right conditions of temperature and moisture, these 'sclerotia' give rise to a characteristic mycelium which was long supposed to be incapable of producing spores (i.e., a sterile mycelium) and placed in the form genus *Rhizoctonia*. In comparatively recent years, however, it has been demonstrated that this Rhizoctonia on the potato is identical with the Basidiomycete *Corticium vagum* B. & C., the latter being the spore-bearing stage. This latter name is therefore given above, as the correct scientific one, while the name Rhizoctonia is also retained as being the one under which the disease is best known.

Fungi similar to the Rhizoctonia stage of the fungus attacking potatoes are also known to cause serious diseases of many cultivated plants, for instance a form of the 'damping-off' of seedlings, and various root and stem rots of beets, beans, lettuce, tomatoes, &c. Whether many or all of these belong to the same species or not remains to be proved, but there seems considerable likelihood of this being the case.

While the 'sclerotia' adhering to the potato tuber are quite superficial and not associated with any rotting or other injury of the tuber, the conditions which have just been mentioned, as leading to the production of mycelium from them, are fulfilled when the tubers are planted. This mycelium which now develops is capable of causing quite a serious disease of the potato crop, attacking the underground stems and roots and also the stem above ground. The effects of this infection show themselves in a variety of ways. Commonly a brown, sunken, 'cankered' area may be found extending along the stem just above the level of the ground. In bad cases this may go right around the stem, 'girdling' it and causing it to dry up. This mode of attack frequently destroys large numbers of young shoots as they make their way above ground. When the tops have reached a fair size, but the underground parts which normally bear the young tubers have been attacked and destroyed to a considerable extent, a cluster of small tubers is often formed at the base of the stem just below the level of the ground. This form of the disease is designated 'little potato'; it is often associated with the formation of small leafy, green or purplish tubers in the axils of the leaves above ground (aerial tubers). Both phenomena in fact are due to the same cause, a surplus of food substances manufactured by the leaves and not used up in the usual way. Sometimes the disease manifests itself in a shortening of the shoot, the leaves being close together. The appearance resulting from this has suggested the name 'potato rosette' commonly applied to it.

The spore-producing or perfect stage of the fungus according to our experience does not seem very abundant. Some very good examples, however, were observed in British Columbia, some have been sent in during the past season from the Province of Alberta, and others were found on the Farm here. It appears to be restricted to the living host plant, and forms an adherent gray very delicate and easily removable layer for a distance of two or three inches or more along the stem or branches above ground.

Diseases due to species of Rhizoctonia are of the kind known as 'soil diseases.' By this is meant that once the organism has been introduced into the soil, it has the

power of persisting there from year to year, waiting the opportunity, so to speak, to attack any susceptible crop that may be planted therein. If, as seems probable, the Rhizoctonia diseases affecting a considerable number of plants are due to one and the same fungus, the danger of introducing the disease into uninfected land is obvious. It is quite true that sometimes the fungus may be present in considerable amount and yet the resulting disease may only be slight, but this is simply because, as with all fungus diseases, other factors, of which for the most part we know little, influence the virulence of the parasite or the resistance of the host. It is at least equally true that when conditions favour the fungus, serious results may follow, and therefore if the fungus be present there is always the danger of such results. Hence it is most important to avoid introducing the fungus into uncontaminated soil.

Fig. 3.—Rhizoctonia Disease of Potatoes. The black spots are the so-called "Sclerotia." In this stage the fungus is carried over from the preceding year.

Although mention has just been made of a spore-bearing stage, yet there is little doubt that the parasite is mainly disseminated by the 'sclerotia.' It would greatly reduce the danger of infecting healthy soil if only tubers quite free from disease were used for 'seed.' As, however, in practice this is almost impossible to carry out, tubers which appear to be free from disease should be selected and subjected to some treatment that will kill any sclerotia adhering to them. For this purpose the treatment so widely used against potato scab is generally recommended, but does not seem to have given uniformly satisfactory results. In this connection an experiment conducted at the Central Experimental Farm this last season yielded some interesting results. Two lots of potatoes, both badly and about equally affected with sclerotia were taken. One lot was soaked for three hours in formaldehyde solution of the strength usually employed against potato scab, viz., ½ lb. in 15 gallons of water. The other lot was soaked the same length of time in a solution of 1 part, by weight of

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Potato Canker (*Chrysophlyctis endobiotica* Schilb.) as it occurred on potatoes imported into Canada from England.

corrosive sublimate in 2,000 parts, by weight, of water. This is half the strength and twice the time usually employed against potato scab. The tubers at the expiration of the treatment were removed from the solution, spread out till dry, cut and planted in beds in the same plot of ground. At harvest time it was found that the tubers grown from the 'seed' treated with formalin were almost as badly covered with sclerotia as those originally planted, while those from the tubers treated with corrosive sublimate were practically clean. It would seem, therefore, that treatment with corrosive sublimate in the manner indicated is much the more effective measure against this disease, while it is certainly just as reliable as the formalin against scab. The chief objection to the use of this chemical is its deadly nature as a poison if taken internally, so that all reasonable precautions should be taken in using it. It should also be mentioned that the solution corrodes most metals and should therefore be prepared in a wooden vessel.

Apart from treating the 'seed' in the manner indicated there is little to be done. No remedy is available for plants once attacked, and applications to the soil seem to have little value. In some Rhizoctonia diseases applications of lime to the soil have been found useful, but such alkaline dressings have a marked tendency to increase the severity of potato scab, and if this disease be also present the amount of harm done in this way would likely more than counterbalance any possible good in the checking of the Rhizoctonia.

The question of distributing this disease by means of affected tubers became very prominent at the time of sending out small samples of seed potatoes from the Farm, when it was found almost impossible to secure sound smooth tubers. For the purpose of preventing this disease it was suggested to treat the tubers in the above manner with corrosive sublimate before sending them out to farmers. The objection, however, was raised that the quantity of poison adhering to the surface of the tubers might have fatal or injurious results, should any of these potatoes be used for food, instead of for planting as intended. To ascertain whether a quantity sufficiently large to cause injury to persons consuming treated potatoes, the Dominion Chemist, Mr. Frank T. Shutt, M.A., kindly undertook to investigate this matter, and the results of his labours are herewith incorporated, with his kind permission:—

Re TREATMENT OF POTATOES BY MERCURIC BICHLORIDE (CORROSIVE SUBLIMATE).

We have carried out a series of experiments to determine the amount of mercuric bichloride that might be absorbed or retained by any given weight of potatoes on treatment for Rhizoctonia.

The treatment consisted in soaking the tubers for three hours in a solution of mercuric bichloride of the strength 1—2000, removing them from the solution and, without rinsing, allowing them to dry by exposure to the atmosphere at room temperature. The potatoes analysed were examined 24 hours after treatment.

Two methods were adopted: the first, a direct one, in which the amount of mercuric bichloride in or on the potatoes was determined, the second, an indirect one, in which the amount of this compound removed from the solution by the potatoes was ascertained. It is satisfactory to note that the results by both methods were closely concordant.

Omitting the details of the various methods used in the analysis of the tubers and the solution, it will suffice to state that we found 3 pounds of potatoes (13 tubers) after treatment to contain, approximately, ·052 grams mercuric bichloride. By analysis of the solution used in their treatment it was found that its content of the fungicide, i.e., its strength, had been reduced 10 per cent, which on calculation showed that 3 pounds of potatoes had removed, approximately, ·05 grams bichloride.

The usual dose of mercuric bichloride is between $\frac{1}{32}$ and $\frac{1}{16}$ of a grain, and the maximum official dose is $\frac{1}{8}$ grain. There are not apparently many cases on record of

fatal poisoning by this chemical, but it is stated by an eminent authority on toxicology that ·19 grams (approximately 3 grains) have proved fatal.

The amount of mercuric bichloride, according to our findings, contained on or in 3 pounds of treated potatoes, is approximately ·05 grams or $\frac{3}{4}$ grain, an amount equal to 6 maximum official doses. This, in my opinion, would render it highly desirable that the treated potatoes sent out should be accompanied by a statement that the tubers have been treated and are in consequence non-edible.

A fact of some interest that has been brought to light in connection with this treatment is that the strength of the solution is materially reduced by the potatoes. This, I think, points to the necessity of rejecting the solution after it has been used three or four times, and a freshly prepared one substituted.

(Signed) FRANK T. SHUTT,
Dominion Chemist.

From the above analysis it is quite evident that serious consequences may be entailed from the consumption of potatoes treated with so weak a solution as 1 in 2000 corrosive sublimate.

The analysis brought out, however, another very interesting fact, i.e., the material reduction of the strength of the solution. This point has to my knowledge never been exposed, and it seems reasonable to deduce that the removal from the solution of the ingredient used to kill the fungus no doubt accounts for the often limited success in preventing the reappearance of diseases, which might have been assured by employing a fresh solution after treating a quantity of tubers. An experiment will be undertaken with the view of observing the action of the solution by using it over and over again.

PHOMA ROT OF TURNIPS (*Phoma napobrassicae*, Rostrup).

(Figure 4.)

In January of this year a correspondent in Prince Edward Island sent to the Division for examination a specimen of Swedish turnip affected by this disease. According to the statement of our correspondent, the disease was first noticed when the turnips were about half grown. In some instances, the plants were killed outright while still immature, by the disease extending round them, but the chief loss occurred after the roots had been placed in storage, a large proportion of them decaying. The trouble was furthermore stated to be serious in many turnip fields in the vicinity. However, as no other specimens were submitted, it cannot be regarded as certain that the disease was the same in these other cases.

Attacked roots show discoloured areas; beginning near the centre of which the fruiting bodies of the fungus are developed; minute black *pycnidia* containing large numbers of exceedingly minute spores 4 to 6 micromillimeters long by about 2 broad. The affected spots may subsequently break down with a kind of dry rot or, more usually, the mycelium rapidly extends through the tissues, producing a soft rot. The behaviour in this respect will be governed mainly by external conditions, especially warmth or moisture. No doubt, too, in many cases various bacteria and fungi obtain entrance through the tissue first killed and assist in hastening decay.

The disease was first described by Rostrup about 1891 (*Tiddskrift for Landökonomi, R. 5, Bd.* 11: *330*), and a short note subsequently published by him in the *Zeitschrift für Pflanzenkrankheiten* 4 (1894): *322*. Later it attracted attention in England (*Potter, M. C., Jour. Board of Agric., 1900, p. 48*). It is, however, not confined to Europe being well known and destructive in New Zealand as the following extract will show (*Kirk, I. W., Bull. 14 Div. of Biology, N. Z. Dept. of Agr., 1909*):—

'Large areas of turnips have been ruined both in the North and South Islands, and the disease attained to an epidemic condition within a single season. A feature that is present this year (1908) and which was formerly absent, is the rapid soft-rotting of many of the affected tubers. This in many cases has been almost entirely due to the rapid spread of the Phoma mycelium within the tissues, breaking down the cell-walls, but in other cases bacterial agencies have come into play closely following the infection of the turnip by the Phoma.'

Fig. 4.—Turnip Bulb showing lesions caused by *Phoma napobrassicae* Rostr. (after W. Carruthers).

So far as we have been able to learn, this disease has not been previously recorded from North America, and the finding of it here would seem to add another to the list of parasitic diseases which have gradually become known, and in many cases feared, in temperate climates all over the world. Whether or not the disease is likely to prove as serious here as in the moister climate of New Zealand cannot, of course, be judged as yet, but it is certainly in the highest degree desirable that all reasonable precautions be taken to prevent it from spreading. The fungus, so far as is known, is carried over from year to year in the soil, and therefore the most important control measures should be directed towards keeping soil as yet known to be uncontaminated free from infection. Where the land has borne a diseased crop, the growing of turnips should be discontinued for some years, and care taken not to carry the soil from such a field on implements &c., to healthy land. Spores that have been eaten by farm animals are hardly likely to retain their vitality, but on the other hand, if diseased roots are fed to stock, the refuse left by them containing living spores is almost certain to ultimately find its way to the manure heap, and thus contaminate any land to which such manure is subsequently applied. It would be far preferable to destroy all the affected crop by mixing it with quicklime, or to feed it to stock only after steaming or otherwise cooking it to kill all spores. The sacrifice of a crop in such cases may seem a very drastic measure, but when it is a question of allowing a disease of unknown virulence under our conditions to

establish itself or not, too great care cannot be exercised. Affected turnips do not keep well in storage; a large number of other fungi or bacteria gain entrance through the Phoma lesions and cause a rapid decay of the roots, rendering them offensive by their odour, and disagreeable to the animals to which they are being fed.

CLUB ROOT IN TURNIPS (*Plasmodiophora Brassicae* Wor.)

Club Root, a disease affecting Turnips, Swedes, Cabbages and a large number of cultivated and wild cruciferous plants, has been fully described and figured in the report of last year p. 257 plate XI.

The disease, which disfigures and in many cases renders totally unfit for any kind of use the plants attacked, is becoming more serious and widely spread, so that farmers growing any of the plants susceptible to this disease should practise every means to prevent it or confine its attacks to the most limited areas.

Method of spreading the disease.—The disease is spread through infested soil. Soil carried from an infected field in any way contains a large number of disease germs which will immediately reproduce the disease, when coming into contact with the plants mentioned.

There is every reason to believe that the disease is spread by infected seeds. Seeds may be soaked for half an hour in a solution of 1—2,000 Perchloride of Mercury, which will not impair their vitality in the least degree, and sown when dry enough. This precaution should be employed on clean farms. Turnips sown on infested land without exception will become affected.

Do not throw any diseased portion of affected plants on to the manure heap, but throw them into a pit and apply plenty of unslaked lime. Spraying does not control the disease, as the seat of its attack is underground.

Lime versus Club Root.

Experiments with club root of turnips were outlined, and conducted at the Charlottetown Experimental Station for Prince Edward Island. The Superintendent, Mr. J. A. Clark, B.S.A., kindly took charge of the experiments throughout, and many thanks are due to him for his courtesy and trouble in carrying out so carefully the suggestions. A full account of the experiment will be published after some few years, when it is hoped that more reliable and valuable conclusions may be drawn, which one single experiment hardly admits of. Briefly, the experiment conducted was to try the effect of lime on badly infested land. Plots of ½₀ acre in size received a dressing of unslaked lime at the rates of 150, 100 and 75 bushels per statute acre; a plot of the same size received no lime.

The beneficial effect of liming was very prominent during the year of experiments throughout the plots.

Sound turnips were harvested from the untreated plots amounting to 720 lbs.

Sound turnips were harvested from the plot receiving 150 bush. lime amounting to 2,003 lbs.

Sound turnips were harvested from the plot receiving 100 bush. lime amounting to 2,332 lbs.

Sound turnips were harvested from the plot receiving 75 bush. lime amounting to 1,824 lbs.

Different dates of sowing the seed were also tried with the following results.

Sound Turnips from Average of Plots treated as shown.

Untreated plots.	Lbs.	Treated plots.	Lbs.
Sown June 1	168		747
" 15	179		651
" 30	373		664

The experiments will be continued. So far, it is shown that while the application of lime has not entirely eliminated the disease, it has notwithstanding, reduced it.

BITTER PIT OR FRUIT PIT OF APPLES.

A number of inquiries have again been received regarding this trouble, an account of which was given in the report for last year. While not nearly of the same importance in Canada as in some other countries, for instance in South Africa and Australia, it is of special interest from the fact that, notwithstanding a great deal of attention having been given to its study, it has so far received no satisfactory explanation. In Australia it has been considered of so much moment that Mr. D. McAlpine, the leading Australian plant pathologist, has been commissioned by the Commonwealth Government to devote himself entirely to the study of this disease at a salary of $10,000 per annum for a period of years or until a solution is found.

During the past year also two important papers have been published by Australian investigators which record the results of experiments undertaken to demonstrate that the cause of the disease is to be found in the poisoning of certain cells of the fruit by absorbed mineral poisons.

In the first of these papers, by Dr. Jean White, it is shown that spots quite similar to the more superficial ones of bitter pit can readily be produced by rubbing the surface of mature apples with such substances as chloroform, corrosive sublimate and arsenate of lead. It is suggested, therefore, that under orchard conditions 'pitting' is probably due to local poisoning following the entrance of some of the spray material through the lenticels of the fruit.

In the second paper Prof. Ewart, of Melbourne University, shows that the pulp cells of the apple fruit are more sensitive to certain poisons than 'any other known organisms;' corrosive sublimate for example being toxic in any solution of greater concentration than 1 in 10,000,000,000. At the same time, the uninjured cuticle and bloom are remarkably impermeable to such solutions. Young apples were found to be more readily penetrated by dissolved poisons than old ones, but, on the other hand, their pulp cells are more resistant, so that an apple at this stage may absorb a quantity of poison insufficient to cause immediate injury but yet capable of killing a group of cells as the apple reaches maturity. This is suggested as one possible cause of the deep-seated spots, but it is also believed that in this case, as also where bitter pit occurs in unsprayed orchards, sufficient poison may be absorbed by the roots and circulated in the sap to cause the death of the fruit cells. While the results of these recent investigations do not furnish all the data necessary in making specific recommendations for the control of the trouble, the advisability of adding enough lime to spray mixtures, whether fungicides or insecticides, to reduce the soluble compounds to a minimum is emphasized. Aside from this particular factor, if it be really the case that the affection may result from the absorption of naturally occurring mineral compounds in the soil control may still remain difficult or impossible, and further work along this line will be awaited with much interest by plant pathologists.

SHOT HOLE DISEASE SERIOUSLY DESTRUCTIVE TO CHERRIES IN PRINCE EDWARD ISLAND.

The Department of Agriculture of this Province called the Division's attention to the presence of a destructive disease attacking the cherries in the Island. A number of correspondents from Prince Edward Island had previously sought advice concerning the control of this widespread disease. A visit was paid to a number of localities with a view of discovering the cause and suggesting practical means of preventing the further spread of the disease.

Complaints have reached us from many quarters stating that 'all the cherry trees of the Island were being gradually killed.' The disease which certainly was very widespread was recognized on microscopical examination as being caused by a minute fungus of the 'shot hole' group. This fungus, technically known as *Cylindrosporium padi*, Karst., causes a number of roundish perforations of the leaves, which by some people are described as resembling 'gun shot' holes. The attacks of cherries, plums and other stone fruits by this fungus are by no means rare, though in Prince Edward Island the disease was unusually destructive. Correspondents observed that the trees had begun losing their leaves early in June; in some instances complete defoliation had taken place by August.

Naturally the loss of so active an agent in the nutrition of the trees results in weakening their vitality, and on repetition of the attack in the following year, when foliation is sparse already through the injury experienced the previous year, the trees finally succumb, as the result of a combination of causes—the fungus and the lack of nutrition. This was observed in almost every case examined where the trees were found dead.

The fungus prefers sour cherry trees, especially the Morello variety. The trees in Prince Edward Island are mainly wild, sour cherry, and their loss cannot really be considered of much economic importance. We have advised the growers in conversation and through the press to remove all dead and dying trees, and to collect and burn all leaves that have fallen to the ground.

As there is a probability that the fungus may live in the young twigs, it is advisable to protect the trees by spraying at intervals of a week with dilute Bordeaux mixture (5 lbs. sulphate of copper, 5 lbs. lime to 60 gallons of water) from the time the leaves begin to unfold till about three weeks after they have grown to their full size.

It also occurred to us to recommend the planting of a better class of cultivated cherry, partly because of the greater value of the fruit, and partly because the disease causes less damage in sweet varieties. Suitable varieties, no doubt, will be recommended by applying to the Dominion Horticulturist.

'POINT ROT' OF TOMATOES.

This disease, known also as 'End Rot' and 'Blossom End Rot,' was frequently made the subject of inquiry. As the name indicates, the disease is characterized by a rotting of the fruit, beginning at the blossom end. It is most injurious to early fruit, especially in greenhouses. The first sign of disease appears as a dark-coloured or watery spot at the base of the style, usually when the fruit is one-half to two-thirds grown. As this spot extends, the different tissues collapse, producing a flattening of the diseased area. Later, the surface of this area often becomes covered with a black, velvety, fungus growth. The cause of the disease is not quite clear. Various fungi and bacteria are found in the diseased spots, at least in the later stages, and several of these have been considered in different investigations to be the cause. No doubt, when a portion of the tissue has been killed, different organisms may effect an entrance and hasten the rotting, but it seems highly probable that some such injury must first occur, and that it is due to the death of cells in the vicinity of the style as a consequence of drought. It has been conclusively shown that the moisture conditions have a very important relation to the disease, and when the water supply can be controlled so as to be regular and sufficient, as in greenhouses, the loss becomes very much reduced. Under field conditions, the control of moisture is more difficult. When irrigation is not possible, surface cultivation to conserve the moisture should be followed and an attempt made to increase the humus in the soil. Prof. Stewart of

Geneva states that by carefully selecting seed from resistant plants, it is possible in a comparatively short time to secure a highly resistant strain.*

As might be expected from what has just been said, spraying has not proved of any value.

RASPBERRY CANE BLIGHT (*Coniothyrium Fuckelii*, Sacc.)

In August last, Mr. French, Assistant Provincial Holticulturist for British Columbia, sent to the Division from Salmon Arm, B.C., a quantity of black raspberry canes of the Cumberland variety, together with the following observations regarding a disease affecting them: 'It seems to affect only the black-caps. The red raspberries alongside are not affected. The berries become hard and dry early and do not grow as large as the healthy ones. They become hard and seedy with very little juice.' He further stated that in many cases the whole plant ultimately died, and that the disease was doing considerable damage in this plantation.

The symptoms mentioned, though not in complete agreement, suggested the disease studied by Stewart and Eustace, and named by them 'Raspberry Cane Blight,' and which they showed to be due to the fungi *Coniothyrium Fuckelii*, Sacc. (N.Y. Gen. Expt. Station, Bull. 226). A microscopic examination of the British Columbia canes showed the presence of *Coniothyrium Fuckelii* in abundance on many of them. A specimen of an attacked cane was sent to Prof. Stewart, who confirmed the determination.

This disease is a common and destructive one in New York State, and is probably widespread. Its occurrence in British Columbia is of interest as indicating this. It attacks nearly all varieties of cultivated raspberries, both black and red, but there is considerable varietal difference in the degree of resistance. The wild red raspberry may also be attacked. The fungus is confined to the canes, the leaves and fruit being only affected indirectly. Infection apparently takes place chiefly—though perhaps not entirely—through wounds, the effect varying with the point of infection. When infection takes place through the old stub left in pruning, the fungus gradually extends downwards, killing the branches successively as it progresses. When, however, the inoculation takes place lower down on the cane, a partial or total 'girdling' is produced, the bark and wood becoming dead and discoloured. When the 'girdling' is complete, the part of the cane above this point dies, and where it is only partial, the supply of sap to the upper part of the cane, including both fruit and leaves, dries up gradually as the fungus completes its circle of extension around the stem. Attacked canes are noticeably brittle at the diseased spot, on which large numbers of the minute fruiting bodies (*pycnidia*) are ultimately to be found. Spores are produced in great numbers from the pustules and, after dispersal, impart a peculiar, smoky colour to the surface of the cane.

The disease is largely spread in the first instance by means of infected nursery stock. Once introduced, however, into a plantation, any agent that can carry the spores from the diseased plants to healthy canes becomes a factor in its further extension. Wind, rain, insects, and the necesssary operations connected with the crop may all conduce to this, while the fungus may persist for an indefinite period on pieces of diseased cane lying on the soil.

Control measures are not easy to carry out. Where the disease has become serious, it is best to dig up and burn the old plants and set out a new plantation on land where the disease has never appeared. In doing this every care should be taken to obtain the new canes from a plantation where the disease was not present. It is not possible to tell merely by examining the canes at the time of setting out, whether

* I have had an opportunity while visiting Geneva of seeing one of these selected strains of tomatoes in fruit where this disfiguring Point Rot had been entirely eliminated.

they are diseased or not, as the fungus may be present in them but the effects not yet visible. The plantation from which they come must be examined about fruiting time or the young plants bought under a guarantee. Cutting out and burning the old canes immediately after the fruit is picked will help to check the disease after it has once appeared. Spraying has not been found satisfactory as a method of control.

BLIGHT OF GINSENG (*Alternaria Panax,* Whetzel.)

While ginseng is not cultivated in Canada to any considerable extent, one or two inquiries have been made by Ontario growers regarding this disease and its treatment. The disease is due to the fungus *Alternaria Panax* which, presumably, winters over in the mulch or plant remains in the soil. As the ginseng shoots push their way up through the soil in the spring they become infected by the fungus, the first diseased areas appearing on the stem near the level of the ground as dead, brown, cankered spots or lines. In these spots the spores of the fungus are produced and the disease is spread by them to the leaves where it is usually more conspicuous. The spots on the leaf are very characteristic being large, more or less circular in outline, often confluent, and of a watery appearance. As the disease progresses, the leaf tissue dries out and the spot becomes papery in texture with a yellowish or brownish tint. Usually wet weather and high temperatures are necessary for the disease to become epidemic, and under such conditions it may spread so rapidly that all parts of the plant above ground may be destroyed in a few days. In specimens recently examined the fungus had attacked and grown profusely on the crown of the root.

Control.—The chief preventive measure consists in spraying with Bordeaux mixture. To be effective, this must be applied so as to protect, as far as possible, the young shoots against the first infection. The first spraying must, therefore, be given soon after the young shoots appear above ground and the application must be repeated every two or three days until they are well advanced in growth. Subsequent sprayings should be given at intervals of 10 to 14 days. In some cases, injury has followed the earlier sprayings, this being due to frost occurring after the application. It is therefore advisable to avoid spraying when there is reason to expect a sharp frost ensuing just afterwards.

LEAF SPOT OF IRIS (*Heterosporium gracile,* Sacc.)

Leaves of cultivated Iris are often attacked by this disease, and, less frequently, those of Gladiolus. It is also recorded as affecting a number of other iridaceous plants both in the greenhouse and out-of-doors. The disease shows itself as small round, elliptical, or occasionally more elongated spots of a pale-brown colour, but surrounded by a conspicuous dark-brown border. Most of the spots are usually small, but the large ones may be half-an-inch in length. The centre of the spot becomes paler with age and ultimately shows numerous minute, black points which are the tufts of spore-bearing hyphæ. The leaf tissue adjacent to the spots also becomes discoloured, and, when these are numerous, the whole leaf withers up prematurely.

Usually the disease does not develop extensively until comparatively late in the season, and the injury done to the plants is not, therefore, so serious as would otherwise be the case. Affected leaves should be removed and destroyed as soon as noticed. In this way, the spread of the disease will be checked. Where the disease has been at all severe, all dead leaves and refuse from the attacked beds should be gathered together and burned in the autumn. If allowed to remain on the plants, the fungus is found to develop abundant spores very early in spring, and the disease is almost certainly perpetuated.

BLACK SPOT OR LEAF BLOTCH OF ROSE TREES (*Actinonema Rosae* (Lib.) Fr.)

This is a common disease of rose bushes and was very noticeable around Ottawa last season. As indicated by its English names, the disease appears as black spots or blotches on the leaves. These occur on the upper surface. Individual spots are usually of small size—a quarter of an inch in diameter or less—but, when numerous, become confluent into irregular blotches of varying extent. Not infrequently the entire surface of the leaflet is thus blackened. The margin of the spot is uneven and not very sharply defined, while a close examination of the surface under a lens shows a radiating network of fungus threads. The leaf tissue around and between the spots generally turns yellow and the affected leaflets fall prematurely. Badly attacked bushes become completely defoliated much before the usual time.

Control.—It is important that the fallen leaves with the fungus on them should be collected and destroyed as far as possible, since these harbour the fungus till the following season. Early in the year before the buds burst a 'cleansing spray' should be applied to the bushes to destroy any adhering spores, and care should be taken to also spray the surface of the soil around the bushes. For this early spraying strong Bordeaux mixture (6-4-40) or a solution of 1 lb. copper sulphate in 40 gallons of water may be used. After the leaves appear, weekly sprayings may be necessary. Bordeaux mixture is satisfactory for this purpose, but produces a somewhat unsightly effect with ornamental plants. It is therefore preferable in such cases to use ammoniacal copper carbonate. Spraying should be discontinued while the plants are in bloom. Much may be done towards reducing the severity of the disease by taking cuttings from healthy plants.

DODDER ON CULTIVATED ASTERS.

In the month of September, a letter was received from a firm of florists in Ontario, asking advice regarding an abnormal condition of a bed of China or Garden Asters (*Callistephus hortensis* Cass.). Specimens of affected plants being submitted to the division for examination, it was found that they were badly parasitized by a species of Dodder. It is well known that *Cuscuta Gronovii* Willd., our commonest native dodder, has a large number of different hosts amongst both wild and cultivated plants, and it was thought likely that this species would be the one responsible for the trouble in the case under consideration. Closer examination, however, showed that the species was *C. arvensis* Beyr. The interest of this lies in the fact that this species is chiefly found on clover and alfalfa amongst cultivated plants. A sample of the seed from which the Aster plants had been raised was found to be quite free from that of any species of dodder and it would seem, therefore, that seeds must have been present in the soil from a preceding attack. No particulars, however, were available in regard to this. The pulling and burning of all the plants in the bed was recommended, and since there seemed a likelihood that some of the dodder seed had matured, it was also advised that asters be not grown there next season.

A specimen of a dodder plant was also sent in from a greenhouse Geranium, but as flowers had not yet been produced the species could not be determined.

EDIBLE FUNGI.

The Morels (*Morchella* sp.).

There are few kinds of fleshy fungi more distinctive in appearance than the various species of Morel, and since none of them are poisonous or disagreeable but all are possessed of excellent culinary properties, they may be gathered and used with perfect confidence by persons who might find considerable difficulty in separating some other edible fungi from allied species capable of producing unpleasant effects.

The size varies considerably with the different species and also among individuals of the same species, the height being from one to six inches. The larger ones are the more desirable for cooking purposes. Each individual usually consists of two well-marked portions, a stalk and a cap, which again are generally quite continuous. Both stalk and cap are hollow, and the latter is of a more or less conical or oval form. When young, the cap is generally yellowish in colour, becoming darker with age. Old specimens are often of quite a dark-brown tint. The stalk is much paler in colour than the cap. The most characteristic thing, however, is the peculiar structure of the cap whose external surface is furnished with plates or ridges branching and uniting again in such a way as to form a complete network, the meshes of which enclose deep, more or less polygonal, pits.

The Morels appear early in the season and grow in shady places such as the borders of woods or the more open spaces therein. They may often be met with in considerable quantities, and, when more are gathered than can be used at once, they may be dried and kept for winter use, when, after soaking over night in water, their delicate flavour will be found well preserved. Morels are generally very sandy, and should be carefully washed and cleaned before use, otherwise the enjoyment when eating them will be much reduced.

AGRICULTURAL BOTANY.

The number of plants submitted for identification showed a considerable increase over last year. No new weed was brought to our attention, but some of the well-known weeds like Devil's Paint Brush, Lamb's Quarters and Field Bindweed seem to gain firm possession of some farms, and, where no vigorous methods for their eradication have been employed, they have come to stay. Again there were many inquiries concerning the suspicious nature of the common,

FIELD HORSETAIL (*Equisetum arvense* L.)

on which further observations were made. The poisonous nature of a closely related species of Horsetail, *Equisetum palustre* L.—by no means rare in this country—has been established beyond a doubt. This plant is correctly considered a highly injurious weed, both in the green and dry state. It is the common experience of observers, however, that, in the green state, this plant, and indeed a large number of other poisonous plants, is rarely eaten by stock; their power of discrimination serves as a fairly safe protection. As a rule, young and inexperienced animals fall victims to poisoning by plants more readily than do older animals. In the dry condition, in hay for instance, no animal is able to select its food, and hence the largest number of indisputable cases of plant poisoning are due to giving contaminated hay as food. Another point of interest is that some kinds of animals are far more susceptible to plant toxins than others. Thus pigs and sheep are singularly immune. Cattle and horses also vary greatly in their susceptibility. *Equisetum palustre* L. is far more serious to cattle, indeed often proves fatal, while it causes but slight trouble to horses.

Equisetum palustre L. has long been suspected as being a fatal poison, and the most recent investigations confirm this conclusion.

As regards the common Field Horsetail (*Equisetum arvense* L.), however, opinions continue to differ, some investigators regarding it as quite harmless, others as of slight importance as a weed injurious to stock from a merely mechanical aspect. In our experience, cattle do not suffer any inconvenience at all from this weed, or only very slight disturbance of their digestive organs, while horses seem conspicuously subject to fatal poisoning by this species.

In co-operation with Dr. Rutherford, Veterinary Director General, we have been enabled to collect some very important data concerning this herb. A considerable number of cases of horses being mysteriously poisoned led to an examination of the herbage being made by a trained botanical assistant, and the constant association of this weed with such cases ultimately induced me to publish a short note in the report for the year ending March, 1910, warning the farmers against this weed (Dominion Experimental Farms Report, 1910, p. 280). Meanwhile we have continued the investigations, which have now established that the common Field Horsetail is seriously poisonous to horses.

A considerable number of cases of horses being poisoned have been reported during the last year, and an examination of the hay on which they were fed revealed in every case the presence of this species of Equisetum; moreover, as soon as the food was changed, the horses, if not too seriously affected, made a rapid recovery. In no case was there present any other poisonous weed that could have been responsible for the trouble. Also the symptoms recorded by veterinary surgeons who have investigated the disease were the same in every case, so that the evidence is very conclusive.

After calling attention to the properties of this weed, a large number of inquiries were received, which showed that cases of poisoning were occurring far more frequently than one would have been led to believe.

One typical case was brought to our notice by an experienced veterinary surgeon which it is desirable to quote, as it appears of considerable interest:—

'We have a very common and peculiar disease in this locality which I call a form of spinal meningitis.

'Symptoms.—Staggering gait, partial loss of motive power, very excitable and good appetite.

'As disease progresses, mucous membrane congested, constipation, urine highly coloured, complete loss of motive power, deglutition lost, heavy breathing convulsions and death.

'In all the numerous cases that have come under my notice and treatment, I find a certain rush or weed in the food, which I am forwarding to you.

'I honestly believe the toxins from this weed are the cause of this disease, and I further know that there is little use in treating patient if allowed food with weed in it, for they seem to have a craving for weed if once affected with this disease. The patients, if still able to stand, if the weed is kept away from them and internal antiseptics, etc., used, will recover to perfect health.'

The weed submitted to me for examination was *Equisetum arvense*, L., common field Horsetail. The description of the symptoms of the diseased animals agrees very closely with all other records and those known of cases of poisoning by *Equisetum palustre*, L.

Any one observing these symptoms should at once change the food, and submit a sample to us for examination. Dr. Rutherford kindly informs us that the treatment which he recommends, and which has been proved successful by those who have had the opportunity of investigating cases of poisoning by this weed, consists of a liberal allowance of clean, easily digestible foods, the administration of a sharp purgative followed by good-sized doses of nux vomica (two teaspoonfuls in food three times a day).

When this treatment is begun before the horses lose the power to stand and can be kept on their feet, their lives can be saved in practically all cases.

In conclusion, it may be said that these weeds grow commonly in moist, undrained localities; they will soon disappear if proper drainage is provided. It may also be useful to encourage the growth of good fodder grasses by giving the land a top dressing with seed at the rate of 10 pounds per acre. This would tend to reduce the percentage of the Horsetail in the hay, though this practice should not be considered a solution of the problem.

BROOM CORN AND ITS POSSIBILITIES IN CANADA.

Broom corn is a plant belonging to the Grass family It is closely related to the Sorghums, Millets, &c. The main difference, however, from the common plants of the genus, is the peculiar character of its panicle or seed heads, which consist of a series of long, straight, upright branches. These seed-bearing stalks are of considerable flexibility and a bundle of them tied together form a very useful and durable broom. It is for this product that broom corn is mainly cultivated. Canada imports nearly all broom corn or manufactured brooms from the United States and Europe. During the present year of report, raw material and the manufactured article imported represented the value of about $420,000.

Broom corn is raised at present in Canada to a very limited extent, the fact of the value of the imported material and the information supplied by one of the foremost manufacturers in this country stating that there is a ready market for all the broom corn that could be grown in Canada, not only justifies but encourages careful attention to the possibilities of the crop in this country. Repeated inquiries have manifested the interest taken by some farmers in the raising of this crop. Exaggerated rumours of high prices, like $150 to $200 per ton which this product has on rare occasions commanded, naturally excited the curiosity and speculative tendencies of a certain class of people, but the more conservative estimate of $80 per ton and the fair yield of about one-third of a ton per acre should suffice to show that no great wealth may be rapidly gained from this source.

The successful growing of broom corn is much more dependent upon suitable climatic and soil conditions, than upon cultural methods, which differ little from those required in the raising of Indian corn. A fertile soil is necessary to produce a good 'brush,' which is the manufacturers' term for the seed-bearing heads; the plant is subtropical, and hence requires a warm, sunny climate. There is no reason to believe that there are not some localities in Canada suitable for the culture of broom corn.

In order to speak more authoritatively on the subject, we conducted a series of experiments with broom corn during the year in many different localities. The interest which these experiments have created amongst many farmers, although no perfect crop was raised anywhere, makes it desirable to continue them on a somewhat larger scale, many farmers having declared their readiness to carry out experiments on their own farms. It is hoped that in a few years satisfactory evidence may be produced in favour of or against the raising of broom corn in Canada.

As one of the more successful experiments as regards size and quality of 'brush' may be considered the one carried out at the Central Farm.

During 1911, only three varieties were tested; to begin with, the seed was not of the first class and the stand was uneven. We hope, however, for more success from the experiments to be conducted this year, when a full report will be issued.

SABLE ISLAND.

Dr. Wm. Saunders, C.M.G., the late Director of the Experimental Farms, began in 1901 a series of experiments on this lonely and exposed Island, in order to introduce some resistant kind of vegetation which would be useful in preventing the blowing of the sand and the wasting away of the coast by the action of the waves. An interesting account of Dr. Saunders' visit will be found in the report of the Dominion Experimental Farms for 1901 pp. 62-77.

The main difficulties against the establishment of trees and shrubs on the island are the absence of any depth of soil,—only three or four inches of partly decomposed vegetable matter has collected in some places—the extraordinary force of the wind, which blows often 80 miles per hour and more, the grinding power of the loose sand

itself, the rapid covering with sand of low-lying, rather more protected areas, and finally the blowing away of sand where trees might succeed, which lays bare their roots in a very short time.

Bearing these extraordinary combinations in mind, it cannot surprise anybody that very little success accompanied the planting of the many trees and shrubs, which were brought by Dr. Saunders to the island under many difficulties, and which received every care from the island's hospitable superintendent, Mr. R. J. Boutellier.

The main vegetation of the island consists of a very coarse, but useful sand-binding grass—*Ammophila arenaria*—which grows to a height of about two or three feet, but, owing to the prevailing winds it is bent down affording thus only protective covering for a height of a foot and a half or rather less. Only about 30 of the 80,000 trees and shrubs planted in 1901 have survived, but none grew above the protective height of the grass. As soon as any growth appeared above this line, the loose sand got hold of it and ground it down in a few hours during a storm. There is no protection afforded by the many sand hills, all sides are exposed to wind and weather, one side fills in, while the other is scooped out again. The incessant changes in the direction of the wind are naturally against the survival of even those trees and shrubs which have done well under similar but yet so different conditions. The erection of storm fences, which have proved satisfactory in many similar circumstances, have proved equally unsatisfactory on Sable Island. A few willows, an American elm and some roses have survived behind fences surrounding the house of the superintendent, but the leaves that may incautiously venture above the fences are rapidly lacerated by the sand or dried up in the everlasting wind.

During a few weeks visit, I observed with great surprise how eagerly the wild ponies and cattle devoured the coarse grass, which no doubt would cause considerable soreness to the mouths of the mainland animals. Yet Sable Island ponies thrive on it, and I have been told by Mr. Boutellier that they do not seem to relish timothy hay sent from the mainland in years when there is poor haying on Sable Island. The fact that this grass possesses a highly nutritive character has been clearly demonstrated by the interesting chemical analysis of it made by Mr. F. T. Shutt, M.A., the Dominion Chemist, who states that it is quite equal in protein or albuminoids to many of our highly esteemed cultivated grasses.

The question of preventing the blowing of the sand and the washing away of the shores of this island, which is a most important point of support for two lighthouses marking an extremely dangerous region of shallow spreading submerged banks, so disastrous to many a vessel, is still as prominent and unsolved as ever. After a very careful survey of the floor of the island, and in consideration of the already quoted aggravating difficulties, a probable solution may lie in the direction of encouraging and propagating as much as possible the vegetation already on the island.

During the time of my visit in August and part of September, of course a large number of plants had disappeared, or at least were no longer conspicuous by their flowers or seeds, but still about 150 different plants have been observed and collected. The vegetation on the whole affords excellent examples of the survival of the fittest, or adapation to environment, as well as remarkable features of ecology. The flora is a curious assemblage of maritime, fresh and salt water, European and American plants, and it is hoped to complete a collection of the plants on Sable Island some other time when a visit earlier in the season would augment our collection considerably. A thorough knowledge of a flora thriving on such an exposed and sandy island would be very useful in many instances where such plants may be requisite under conditions existing on the mainland.

Sable Island is very productive of blueberries, and still more of cranberries, of which as many as 60 apple barrels-full may be collected in some years. The col-

lection and export of these fruits may be regarded as an important factor in preventing the perpetuation of this vegetation by seed, but it cannot be said that this practice is really detrimental, because there are many localities where berries are never collected, and where sufficient seed is produced. The berries grow to excellent size, and often 3 to 5 fruits may be found attached to a single stem.

There is a peculiar absence of pollenizing insects on Sable Island which would be instrumental in the act of propagation of many plants. This difficulty might be successfully overcome by the keeping of bees at the various stations. There would be food in great quantity for the bees and the honey might equal the famous moor honey of Yorkshire, where bees feed on a very similar vegetation. The keeping of sheep might also serve as a very useful measure, the close feeding of certain vegetation, the compacting of the ground by their feet and their valuable manure would tend to increase root action and produce a firmer surface. At any rate it seems clearly established that little benefit will result from the introduction of trees and shrubs on Sable island.

BOTANIC GARDENS.

One of the main purposes of a Botanic Garden is to enable the visitors interested in any particular plant to ascertain its correct name. For this purpose we have begun labelling the plants with plainly printed large labels of a permanent character. This work entails considerable painstaking and careful research owing to the difficulty of the everchanging nomenclature of plants. When, in a year or two, all plants have been labelled in this way the gardens will be much increased in value to the general public and the student of Botany. A number of new plants have been added to the collection and many are being raised from seed.

On October the 24th the garden was honoured by a visit of Their Royal Highnesses the Duke and Duchess of Connaught, who seemed to be much impressed with the beauty and variety of our Canadian flora as far as represented in the gardens. Before leaving Her Royal Highness the Duchess further honoured the gardens by planting a memorial tree in what may be said to be the most beautiful spot in the whole gardens.

It is to be regretted that certain elements among the public make themselves guilty of vandalism. Pure carelessness of some visitors has spoiled many a carefully tended plant. At Christmas time the large and beautiful collection of Conifers is much exposed to wanton destruction by persons stealing their tops for Christmas-trees. Nothwithstanding every precaution, some valuable trees are lost in this way every winter. It is hoped that every visitor will bear in mind that the gardens are solely maintained for an educational purpose. Though we cannot boast at the present moment of an exceptionally beautiful park, on account of its comparatively recent establishment, yet in years to come when the vegetation will have outgrown its artificial appearance, our gardens will certainly be one of the most beautiful on this continent. This reserve may be well considered a national property, and should be the pride of the people of Ottawa.

Over four hundred different species of viable seeds were collected during the season of 1911 from plants in the gardens. A list of these was prepared and sent for purposes of exchange to the Botanic Gardens in different parts of the world. We were thus able to supply desiderata to other institutions, and were fortunate enough to secure a considerable number of seeds in exchange which will be added to our seed collection and used to raise plants for our gardens. It is hoped that our list of seeds for exchange will be greatly enlarged, and that we thus will be able to make returns for some of the privileges accorded us by the courtesy of other institutions during the many years of existence of our own.

SEED EXCHANGE.

We are also much indebted to the Office of Foreign Seed and Plant Introduction at Washington, D.C., for many new plants which were received from this source.

In the endeavour to increase our collections we shall always appreciate any interest shown by private individuals and by kindred institutions; it will also be our aim to supply any demand for particular species of plants that may be desired by other persons who are interested in the same pursuits.

HERBARIUM AND SEED COLLECTION.

Scientific collections become enhanced in value if they are systematically and uniformly arranged. Thus in the rearrangement of the plants in the Botanic Garden, the Herbarium, and the seeds of the same, according to Engler and Prantl's system of classification, we have adopted the method of uniform indexing so that the growing plants, dried herbarium specimens, and seed of the same kind will be found under the same entry number, and thus are for more easily found by students even though they may not be familiar with the collections themselves. An interesting series of sheets has been added to the herbarium comprising the collection made on Sable Island. The collections all show the normal increase.

Some time was devoted by my assistant, Miss Faith Fyles, B.A., to preparing pen-and-ink and water-colour drawings for the report and other divisional publications, as well as for useful records of rare flowering plants, and plant diseases. This work is of great importance in enabling the farmers to more readily recognize the appearance of certain diseases of plants, and to identify noxious weeds and poisonous plants as the case may be. The division is exceedingly fortunate in having a member on its staff whose skill in this work is so exceptional. Many photographs have also been taken where it was thought necessary to keep special records.

In conclusion, the thanks of the Division are due to the many correspondents and other botanists who have readily assisted in the progress of the work or in adding to our collection.

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The Tolman or Open Front Poultry House, Central Farm, Ottawa.

REPORT OF THE POULTRY MANAGER.

A. G. GILBERT.

Ottawa, March 31, 1912.

J. H. Grisdale, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

Sir.—I have pleasure in herewith submitting to you the twenty-fourth annual report of the Poultry Division of the Central Experimental Farm.

The demand for strictly new-laid eggs and the better quality of poultry, has become very great and prices have correspondingly increased, until they reached higher figures last winter season than ever before. These facts should prove great incentives to an increased production of both commodities by the farmers of this country. In order to assist them in this good work—to their substantial benefit—much careful attention has been given, in this report, to the discussion of the following subjects, viz.:—

1. Strictly new-laid eggs and what they should be.
2. How they may be produced and marketed.
3. Prices paid for the select articles on the leading markets of the country.
4. Management of the fowls so as to have them early winter layers.
5. The better quality of poultry and the type of chicken necessary to produce it.
6. The proper care and treatment of the growing chickens in order to have them early layers and quick growers.
7. The lack of chickens of suitable market types throughout the country.
8. What leading purchasers say as to the farmer's great opportunity to make money out of poultry.

All the foregoing subjects which have a direct bearing on the production of the better quality of eggs and poultry, are treated in the following pages, from thoroughly practical standpoints. The information conveyed should be of great value to farmers throughout the country.

The experimental work of the year is described under the following headings, viz.:—

Mating up the breeding stock.

Natural and artificial incubation.

Number of chickens hatched and the progress made by them.

Management of the different colonies of layers.

When winter laying commenced.

Prices obtained for eggs during different months of the year.

I have to acknowledge the aid and co-operation of my Assistant, Mr. Victor Fortier, in supervising and carrying out many of the various experiments which form an interesting part of the work of the year. He has also attended many Farmers' Institute meetings in the Province of Quebec, besides acting as judge at numerous Fall and Winter Poultry Shows in the same province.

Mr. Walter Scott was energetic and painstaking in keeping record of trap nest results; the hatching of chickens by natural and by artificial means; the feeding of rations with a view to winter egg production, etc.

Mr. George Deavey was entrusted with the rearing and management of the chickens after hatching, a work his long experience well qualifies him to do. The care of the poultry buildings of different designs, colony houses and surrounding grounds, was also given to him.

An interesting feature of the work of the winter of 1911-12 was the trial of a poultry house built after the Tolman or entirely open front principle. A full account will be given at the conclusion of the experiment, as to the suitability of this style of house to our climatic conditions.

I have to acknowledge the presentation of sixty eggs from the Buff Wyandotte Club of Toronto. This Club is anxious that the Buff variety of the popular Wyandotte family should be tried in our Division, on their merits, as egg and flesh producers. It is needless to say that every opportunity will be afforded the variety to vindicate the claim to superior merits advanced on their behalf.

A large and growing correspondence in both English and French is a gratifying indication of the increased interest being taken in poultry keeping by the people of the country. The letters received and sent away by our Division, during the past year numbered:—

Letters received	4,956
Letters despatched	6,473

I have the honour to be, sir,
Your obedient servant,

A. G. GILBERT.
Manager, Poultry Division.

REPORT OF THE POULTRY MANAGER.

One of the striking features of agricultural progress, in recent years, is the rapid development of the poultry branch of the farm. This gratifying development affords great opportunity to the farmers of the country to make money out of what has been, in too many instances, a neglected and, as a result, non-profitable department of their work. Experiments of many years and the results obtained and published by many well known farmers, go to show that no branch of farm work pays a better margin of profit than poultry, when properly managed, and never was the remunerative prospect greater than it is at present. Never were inducements, in the shape of high prices, greater than they are to-day. Apart from these considerations there are other features of the egg and poultry industry that are well worth the serious attention of farmers. Some of the more prominent of these inducements may be grouped as follows:—

A home market of rapidly increasing proportions and value.

Prospects of higher rather than lower prices.

A growing demand for new-laid eggs and the better quality of poultry and this notwithstanding increased production and decreased exports.

Room for much production, as shown by the importation last year of $439,000 worth of eggs and poultry; game, $68,000, and of fowls, $23,000.

SOME OF THE CAUSES OF HIGH PRICES MAY BE PUT DOWN TO:

A greater consumption of new-laid eggs than supply.

The high price of meat which has resulted in a greater demand for eggs.

The convenience and despatch with which eggs may be prepared.

A growing appreciation of new-laid eggs as nutritious and toothsome articles of food.

A popular opinion that there is less waste in a dozen of eggs—at the highest price—than in meat of same value.

The greater frequency with which physicians prescribe eggs in many forms of sickness.

The extra care and effort necessary in the production of strictly new-laid eggs and the better quality of poultry.

REASONS WHY PRICES ARE LIKELY TO BE GREATER THAN LESS MAY THUS BE GIVEN:

An increasing population with proportionately increasing demands.

Rapidly growing cities which draw upon a large extent of surrounding country for supplies.

Should there be greater production at any time than the home market requires, there is the unlimited English market ready to take that surplus.

Other reasons might be given but enough has been said to show the paying possibilities of the poultry end of farm work. It is to be borne in mind that it is only strictly new-laid eggs and the superior quality of poultry for which there is the demand at highest prices. It should be the aim of our farmers to place upon the market none but the best quality.

THE NEW-LAID EGG AND WHAT IT SHOULD BE.

First we take into consideration the new-laid egg and how to procure and market it. Secondly the superior quality of poultry and how it may be obtained. This leads to the question, 'What is a new-laid egg?' A new-laid egg should be:—

1. Non-fertilized.
2. Well flavoured.
3. Clean and inviting in appearance.
4. Placed in the hands of the consumer as soon as possible after being laid.
5. Neatly put up in cardboard boxes, or, clean humpty-dumpty crates.

Germless.—It is important, especially in the summer season, to have the non-fertilized, or germless egg, for where there is no germ there can be no germ development, which is likely to take place in warm weather.

Well flavoured.—Good flavour can only result from the feeding of pure, wholesome and varied rations. Corn or cornmeal as part of a ration tends to good flavour and better keeping.

Clean and inviting in appearance.—Eggs will be clean and inviting in appearance if laid in clean nests and collected soon after being laid. A strictly new-laid egg has a chalk-like appearance and a porous shell.

Placing of eggs in the hands of the consumer.—Eggs should be neatly put up in cardboard cartons to hold one dozen each. As a guarantee of their being new-laid they should have the name of the producer stamped on them. The humpty-dumpty egg crate is a neat and clean package. It holds twelve dozen eggs and for that reason is easier to fill with eggs, while strictly fresh, than the larger thirty dozen crates so often used. Too frequently, the farmer holds the eggs until he has enough to fill the larger crate, while it would have saved the eggs from becoming stale, had he used the smaller package. The object should be to get the new-laid eggs to private customer, storekeeper, or market, as quickly as possible after the eggs are laid.

The value of the strictly new-laid egg.—The new-laid egg as above outlined cannot fail to be delicious and toothsome, and will receive the highest price. In order that it may receive the best value, it should be put on the market when the demand for it is greatest and price the highest. It is only good business to sell when the product is worth most. The month of November and the winter months of December, January and February have been, for many years past, noted as the periods of high prices. Do farmers aim to have new-laid eggs at this season? It is to be regretted that, in far too many instances, they miss this paying opportunity, for the reason that their hens are either moulting or beginning to do so. As a result, their fowls are non-productive at the season of best prices. In too many instances the farmer's fowls commence to lay in the month of February, when, eggs are beginning to come in freely and prices are on the decline.

A HINT FROM A MONTREAL PURCHASER.

The following letter from a well-known family grocer in the City of Montreal conveys a hint that farmers will do well to be guided by:—

MONTREAL, January 17, 1912.

DEAR SIR.—Yours of 15th instant came to hand yesterday, but as yet I have not heard from Mrs. M———.

We are getting any quantity of new-laid eggs now and prices have gone off. November and December are the two months in which we find eggs very scarce. If

hen farmers would try and arrange to have their hens lay well during the months named, they would always receive a high price, and the parties who supply us during the season mentioned, we feel in honour bound to continue taking from in the Spring and Summer. I may yet be able to take Mrs. M——— eggs.

Sincerely yours,

(Sgd.) WALTER PAUL.

THE HIGHEST PRICES AND WHEN PAID.

The prices paid by Mr. Walter Paul and other Montreal dealers, were quoted in the report of last year, which ended March 31, 1911. Summarized they are as follows:—

Month of November	40 to 45	cents per doz.
" December	50 to 60	"
" January	50 to 35	"
" February	35 to 28	"
" March	28 to 20	"

These quotations were fairly representative of the prices paid in all the larger cities of the Dominion, with the exception of British Columbia, where higher figures were paid. A correspondent in that Province, who is a fairly large producer of eggs, quotes the average price for last year at 55 cents per dozen.

The past winter of 1911-12, was unusually severe in Central and Eastern Ontario, and the high price of 50 cents per dozen was quoted on the Ottawa market as late as the last week in February. And many of the eggs sold at the high prices named—there is reason to believe—were far from fresh.

CONDITIONS WHICH MUST BE COMPLIED WITH.

But, before the high prices of November and December, which are above quoted, can be obtained, there are certain conditions which must be thoroughly understood and complied with by producers, viz.:—

Hens must moult early to be layers in November.

Pullets of the utility varieties require to be hatched out no later than the first week in May. Sooner if possible.

Hens should be of prolific egg-laying characteristics.

To be early layers pullets should be well fed and cared from time of hatching.

HOW THESE CONDITIONS MAY BE MET.

To have layers in November, the farmer requires to adopt one of two courses:

First, his hens should be fully feathered and completely over their moult by the middle or end of October. So far from this being the case, in too many instances, the farmers hens lay to a late date in the summer season. As a result they moult late and a hen which moults late is usually a late layer. Instances are not infrequent where the hens, on many farms, do not begin to lay until the genial weather of spring incites them to do so.

Secondly, to have pullets hatched so early that they will be well developed and in laying condition by November. There would be no difficulty in attaining this desirable end but for the fact, that hens, on many farms throughout the country, do not exhibit the broody instinct until the spring season is well over. It has been frequently pointed out in previous reports that to have early sitters, hens should lay well during winter. Here it is where the incubator comes in very conveniently—

for by its use a large number of chickens may be hatched out at one and the same time, provided, of course, that the germs of the eggs are strong enough, which they ought to be (especially on a farm) by the middle of April.

THE BEST TIME TO HATCH OUT CHICKENS.

The experience of many years in hatching chickens, at different periods of spring time, leads to the conclusion that chickens hatched out during the first week in May make the most satisfactory growth, catching up to and, frequently, surpassing the earlier-hatched birds. For that reason, the first week in May is recommended as the best period for the farmer to have his hen, or incubator-hatched chicks make their appearance. It may be said that the first week in May is too late to hatch Brahma, Cochin, or Orpington chicks. But we do not recommend either of the first named heavy breeds to farmers, for the reason, that they are too slow in maturing. If the Orpington chicks are well cared for and fed from time of hatching as all chickens should be, the first week in May will not be found too late. But chicks hatched later than the middle of May, more particularly of the heavy varieties, are not to be recommended. If conditions are favourable, by all means, have earlier hatched birds. In the case of the farmer, conditions in the shape of brooder house, or other means of keeping the early hatched chickens warm, independent of outside temperatures, are not frequently found. Hence the recommendation to the farmers to have their chicks come out during the first week in May. At that time the weather is usually warm enough to permit of the young birds being placed outside on the rapidly growing grass. With proper treatment the chicks will be found to literally grow with the grass. When twelve or fourteen weeks old, the pullets should be removed from the cockerels and gently pushed, so as to have them layers in November. The cockerels should be disposed of as soon as fairly well developed, unless kept for breeders as shown under the head of 'How the better quality of poultry may be procured.'

Full instructions as to the proper feeding, care and management of the chickens, from time of hatching until mature age, will be found immediately after the discussion and consideration of 'The better quality of poultry.'

THE SUPERIOR QUALITY OF POULTRY.

As in the case of the finely flavoured and strictly new-laid egg, the production of the superior quality of poultry requires compliance with certain conditions without a thorough knowledge of which success is impossible. The more important of these conditions may be named as follows:—

1. A thorough knowledge of breeds which make the earliest and best market types. Suitable market types are shown later on.
2. The quick development of the chickens of correct type by proper feeding and care.
3. The appreciation of the fact that a chicken may be of the very best type, but if allowed to 'pick up its own living,' it will develop sinew, muscle, bone and feathers, rather than the tender, juicy flesh so much desired.
4. Chickens, coops and colony houses must be kept free of lice. Lice-infested chickens do not thrive. The food has not the same beneficial effect, if a large number of lice are taking the life blood from the young birds.
5. A chicken free from lice and constitutionally robust will be a hearty eater and a quick grower.
6. Without other means than the regular and generous feeding of wholesome rations the young cockerels of correct type should, after two months of age, put on flesh at the rate of one pound per month, and, if in the hands of one who knows how to push the chickens, a gain of at least a pound and a quarter

per month should be made. The writer has time and again had Barred Plymouth Rock cockerels weigh four pounds and a quarter at the age of three months and five pounds and a half and six pounds in four months.

THE GREAT DEMAND FOR CHICKENS OF PROPER TYPE.

There is a growing demand for plump, well plucked and neatly dressed chickens, with a flesh of fine grain and texture. This is proved by the following statements made by extensive purchasers of poultry flesh throughout the country.

Mr. Marshall, M.P. for East Elgin, Ont., who is a member of a firm of canners, asked, while the writer was giving his evidence before the Committee of Agriculture and Colonization of the House of Commons, in the month of February last, the following questions:—

Q. The average weight of the chickens, throughout the country, is three pounds?

A. Yes. Perhaps due to the fact that too many of the chickens, throughout the country, are of a nondescript character.

Q. Are there not a good many now producing poultry for market apart from eggs?

A. There are.

Q. What can poultry be produced for?

A. That depends upon the kind of chickens and how handled. The farmer has a great opportunity to produce the best types of poultry.

Q. The reason I ask is that we are large packers of poultry. I think we had something like 150 tons last year and we paid 14 or 15 cents a pound. We get them dressed with the legs and heads cut off. We find in the section I am living in that there is a lot of money in producing poultry for the market.

A. There is doubtless money in both poultry and eggs.

Q. What surprises me is that the farmers who are pretty sharp people *do not go more extensively* into the business.

The remarks quoted are important as coming from a shrewd business man who knows what he is talking about.

WHAT ANOTHER LARGE PURCHASER SAYS.

Another instance of the disastrous effects on the development of larger markets and the obtaining of better prices caused by the breeding of scraggy and small types of birds by farmers, rather than large and fleshy birds, is thus shown by another purchaser. Mr. Ashton, of Morrisburg, Ont., who is extensively engaged in the fattening of poultry of the better quality, is the purchaser referred to. He carried a letter of introduction from Mr. Andrew Broder, the well known Member for Dundas, to the writer. Mr. Ashton made the extraordinary and important statement, that his business was SERIOUSLY CURTAILED for the reason that he COULD NOT get birds of the PROPER TABLE TYPE IN QUANTITY ENOUGH to fatten. Yet another statement was received from the agent of Messrs. Swift & Company, of Chicago, who is managing a branch at Stratford, Ont. The agent writes as follows:—

On behalf of Messrs. Swift & Co., I have become very much interested in the poultry business in Ontario. I would like very much if we could be the means of assisting the farmers to produce and better finish (flesh) a better type of table poultry for table use. Of the 75,000 to 100,000 heads which we killed during the past season, a very large percentage of them—especially chickens—were of poor varieties and too thin for marketing. * * * One of the weak features in Ontario is the large proportion of small, thin breeds such

as Leghorns, Game-crosses, and one or two of a black breed, possibly Black Spanish, etc. One of my chief reasons for taking up this question with you is the hope that your department might co-operate with us in encouraging the breeding of Barred Rocks and other suitable types of table poultry.

The above statements and quotations show that extensive purchasing firms are seriously handicapped in their business operations, owing to their inability to purchase—throughout the country—birds of suitable fleshing types in numbers sufficient.

Surely the farmers of the country are equal to the occasion. It is ever to be borne in mind that it costs no more to raise a correct type than it does a nondescript. The latter fact has been emphasized many times in previous reports.

HOW TO PRODUCE THE BETTER QUALITY OF POULTRY.

To have chickens of the desirable type and quality, such as are wanted by the wholesale purchasers named, they required to be:—

(*a*) Of correct market type.

(*b*) Must be the progeny of utility birds, also of correct type and flesh quality.

(*c*) Must be carefully housed and well and regularly fed from time of hatching until saleable age.

(*d*) Should not be 'allowed to pick up their own living' without being otherwise well fed.

(*e*) A chicken allowed to become 'stunted' from being 'stinted' of food will not make a desirable specimen.

(*f*) Chickens and their houses should be kept scrupulously clean and free from lice. Chickens infested with lice do not grow well.

(*g*) A desirable chicken should be a quick grower and a hearty eater.

UTILITY BREEDS OF ACCEPTABLE MARKET TYPE.

The Plymouth Rock family.
The Wyandotte family.
The Orpington family (especially the White).
The Dorking family.
The Rhode Island Red family.

Several other varieties might be named. The foregoing however, are best known and are certainly held in the greatest numbers throughout the country.

THE PROPER CARE AND TREATMENT OF THE CHICKS.

At this point it will, doubtless, be interesting and useful to outline the proper care and treatment of the chickens from time of hatching. It is to be ever borne in mind that the chickens may come from a strain of the very best layers, or the most correct market types, but if they are not *well* and *carefully fed* and *properly looked after, from their first days,* they will never make early layers or desirable market specimens. The following course of treatment has been found successful in practical operation—in the Poultry Division—for many years past, viz.:—

A.—Chickens hatched by hens should remain undisturbed in the nest under the hen mother until thoroughly 'nest ripe.' If hatched in incubator they should remain in the nursery until well dried and strong on their legs.

B.—They should then, with the hen, be removed to a coop on the grass outside, and placed in a bright and warm spot. The coop should be slatted so that, while the mother hen is confined to the inside, the chicks may run out or in as they desire. If incubator hatched, the chickens, when fit, should be removed to a brooder which has been warmed to a temperature of 95 degrees and otherwise prepared for the reception of the youngsters.

C.—Before removing the hen and her brood, it is a good thing to gently remove the hen and allow her food and drink. It should be borne in mind that the hen has been steadily on the nest for 36 hours bringing out the chicks and is, doubtless, very hungry. She is more likely, if well fed, to brood the chickens to their great benefit than if she was in a starved condition. It is well to see that both hen and coop are completely free from lice. A lice-infested hen is in a miserable condition; lice-infested chickens soon take their departure from the world. The hen should be kept free from lice while she is sitting so that she will have none when the chickens are hatched, for what is put on the hen is often hurtful if not fatal to the chickens. Should lice be discovered on the hen when with her brood, take her out of the coop and rub the breast feathers and those under the wing the wrong way with a cloth damped (not wet) with coal oil. This treatment will do the hen much good and the chicks no harm.

PROPER RATIONS.

First day.—No food is really necessary for 48 hours. The last thing that should occur before the chick breaks its way out of the shell, is the complete absorption of the yolk. The yolk will furnish nourishment for the chick until it is absorbed, which will be completely done in the case of every strong and robust specimen.

Too early feeding is conducive to acute indigestion, which is fatal in almost every case. It has been noticed that when the chicks have been robust and vigorous and properly handled, during the first days of their lives, no white or any other kind of diarrhœa has followed.

The first thirty-six hours.—No food is required; the properly absorbed yolk furnishes the necessary nourishment. Some breeders keep their newly-hatched chickens without any food for a longer period, and then give grit of chick size, followed by stale bread crumbs, or one part finely-cut hard-boiled egg to three of bread crumbs. Much depends upon the vitality displayed by the chicks. A fatal mistake, frequently made, is to give the newly-hatched chicks food before they have completely absorbed the yolk.

From thirty-six to forty-eight hours.—Give stale bread crumbs, or finely broken pieces of cracker. A very little finely chopped hard-boiled egg may be added to the stale bread crumbs or broken crackers.

Third day.—Give stale bread soaked in milk and squeezed dry till crumbly. Later in the day or the day after add pin head oatmeal, finely crushed wheat, or rolled oats. Continue this treatment for eight or ten days, when finely crushed corn may be given. Boiled rice at any time, on or after the third day, will be found valuable. It is not only nourishing but a bowel corrective.

After twelve days, whole wheat is in order, but should be fed in small quantity at first. Continue the finely crushed corn and boiled rice.

After fifteen days add a little cut green bone. It will be much relished and do much good.

Three weeks and after.—At three weeks a mash made of some or all of the above ingredients with cornmeal or finely ground oats or shorts may be fed. At first, feed a little and often, say a little once every two or three hours. After five or six weeks of age three times per day or oftener if found necessary. Leave no food to turn sour or become fouled.

When well feathered, the chicks should be removed from the smaller coops to colony houses. Ere this the mother hen, if well looked after, has commenced to lay and should be placed among the other adult birds.

Subsequently the cockerels are removed from the pullets and the latter gently pushed so as to be layers in November.

The following quotation from annual report of 1910, has such an important bearing on the successful management of chickens that it will bear repetition, viz.:—

'Growing chickens require special care during the first five or six weeks of their 'lives. During that period there is a steady drain on the system of the chick made 'by the rapidly growing feathers as well as by developing bone, sinew and muscle. 'This fact is frequently overlooked.'

Much attention has been given in the foregoing to the different phases of the hatching and rearing of chickens. Many of the points emphasized are either unknown or wilfully ignored. All of them have an important bearing on results and should be fully appreciated and practised—not only by farmers—but by all poultry keepers throughout the country.

THE MOULTING PERIOD.

If it is considered advisable to bring on an early, or midsummer moult, the following method which has been successfully tried in this Division will be found practicable: At the end of June the sale of eggs for hatching is usually over. A few days later the pens of breeding hens were broken up, the male birds being first removed to another building which contained small compartments with limited outside runs. These small divisions made admirable habitations for the male breeders. The hens with which there were no male birds were then allowed to run at large. In the case of our poultry houses there are small fields in rear of the poultry runs. These fields which contained grass, clover and shade—three important essentials—made ideal resorts for the hens. At this stage the rations were reduced to half quantity. The effect of this was almost to stop egg production, which was the object aimed at. The half rations were continued for two weeks, when full quantity was again resumed. The full ration was composed as follows:—

Mash of coarsely ground oats two parts; shorts one part; gluten meal one part with beef scraps in proportion of one pound to fifteen fowls. The mash, which in summer was mixed with cold water, was fed three times per week. At times a small quantity of linseed meal was added. The beef scraps were used in lieu of cut green bones, because it was not convenient to procure the latter. If mash was fed in the morning, wheat or oats, or both mixed, was given in the afternoon, or *vice-versa*. On such days as mash was not given, grain took its place.

Dr. Scnborn, a well known authority on poultry management, says in regard to the moulting period:—

> 'A moulting hen is easily fattened. Hence at this period feed lightly of those foods which produce fat. Corn, corn meal, middlings, potatoes, must be used sparingly. Increase the amount of green bone, bran and skim milk. A run in a field of clover will be a help. Keep all males by themselves during the moulting period. Shelter the hens from storms or cold rains. The ideal place for a run is an apple orchard where in addition to the grass may be found insects in the fallen fruits, etc. Birds should go into the moult not fat, free from lice and with no mites in the house.'

The moulting period usually lasts from ten to twelve weeks, but in the hands of experienced poultry keepers that time may be reduced. A Nova Scotia poultry keeper claims to have shortened the moulting period by boiling beef heads, then breaking them into small pieces and finally putting them through his bone cutter

and feeding in generous quantity to the moulting hens. As a result he says that some of his birds were laying all the time of their moult. It would be interesting to know whether these midsummer layers made early winter layers or no. The chief aim of the midsummer moult is to have the hens laying freely by the first or second week in November. Again, there are several poultry keepers of experience who claim that early pullets are the solution of early November laying, rather than the early moulting of the laying stock. Both sides have their advocates. We rather lean to the early moulting practice. It may be interesting to note the following, which careful observation has made evident in past years:—

That yearling hens moulted earlier and easier than older ones.

That the progeny from parent stock which had moulted during summer instinctively did so at the same period of the year when fully matured.

That the moulting hens were much benefited by a run in a field where clover, grass and insect life were found.

That where moulting fowls were confined to limited runs, it was found necessary to feed meat and green food at regular periods.

EXPERIMENTAL WORK OF THE YEAR.

The experimental work of the year commenced at the closing of the fiscal year, March 31, 1911, when the following breeding pens of fowls were mated up, viz.:—

TABLE 1.—Showing how the breeding pens were mated up.

Pen No.	Varieties.	Males.	Females.
	House No. 1.		
1	White Plymouth Rocks	1	15
2	White Wyandottes	1	10
3 & 4	White Leghorns	1	29
5	Barred Plymouth Rocks	1	13
6	Black Minorcas	1	7
7	Buff Orpingtons	1	13
	House No. 2.		
	Contained males of different varieties which were used as breeders. A number of spare birds to be used in case of necessity were also kept on hand.		
	House No. 3.		
22	Black Minorcas	1	10
26	White Leghorns	1	21
28	Black Orpingtons	1	2
29	Barred Plymouth Rocks	1	5
	House 2. (Cold) Tolman.		
32	White Wyandottes	1	20
33	Barred Plymouth Rocks	1	26
34	Buff Orpingtons	1	15
35	White Plymouth Rocks	1	15
36	Barred Plymouth Rocks	1	24
	House 3. (Cold).		
37	Barred Plymouth Rocks	1	14
38	White Wyandottes	1	11
39	Barred Plymouth Rocks	1	24

EGGS SOLD FOR HATCHING.

As in previous years there were many more orders received for eggs for hatching purposes than could be supplied. The demand—which came from all parts of the Dominion—was well calculated to instance the widespread and rapidly growing interest being taken in poultry keeping as compared with a few years ago. Numerous orders were received from farmers and others in the Northwest provinces. While such orders were filled with pleasure it was pointed out to the purchasers that results would likely be more satisfactory if the eggs were obtained from breeders near home, for the following reasons:—

(*a*) The saving of express charges.

(*b*) Despite careful packing, the shaking up which the eggs receive *en route* tells against satisfactory results.

(*c*) The importance of purchasing eggs laid by acclimatized fowls, a point well worth considering.

(*d*) The excellent quality of the stock held by the numerous poultry keepers and breeders throughout the Northwestern provinces.

Proof of this latter statement is found in the fact that the poultry shows held in the cities, larger towns and agricultural fairs of Manitoba, Saskatchewan and Alberta, rank among the best in the Dominion. The same may be said of the still more western province of British Columbia, from which not a few orders were received. Apart from these considerations it is to be borne in mind that poultry departments, in charge of competent officers, are attached to the agricultural colleges in the first three named provinces. In British Columbia there is a Provincial Poultry Instructor and assistants, connected with the Department of Agriculture, at Victoria, B.C.

CHICKENS HATCHED BY HENS AND BY INCUBATORS.

The following table, No. 2, shows the number of chickens hatched by natural and by artificial means:—

TABLE No. 2.

Date.	Hatched by.	Number.
1911.		
April 26	Incubator	98
May 1	"	99
" 8	"	58
" 12	"	18
" 12	Hens	13
" 13	"	10
" 14	"	18
" 15	Incubator	122
" 22	"	51
" 22	Hens	24
" 26	Incubator	38
" 30	Hens	54
Total		603

The feeding and management, which the chickens received, are outlined on a previous page. With the care and treatment as described, the progress of the chickens

was satisfactory, particularly so in the case of a group of chickens which was placed on a new piece of ground in an adjoining field. It is hoped to place all the chickens now hatching out on new ground.

SALE OF BIRDS IN THE FALL SEASON.

There was a brisk demand for young and adult stock during the early fall months. Many fine cockerels were sold for breeding purposes at prices varying from one to five dollars, according to quality. Several spare hens were sold at one dollar each. The pullets were reserved for layers and their worth as such was estimated at two dollars each. The birds sold numbered 240 males and 113 females of various varieties.

WHEN THE HENS AND PULLETS BEGAN TO LAY.

Table No. 3.

Breeds.	Hens or Pullets.	Date.
White Wyandottes	Hens	November, 17, 1911.
Buff Orpingtons	"	" 20, "
White Leghorns	Pullets	" 24, "
White Wyandottes	"	" 28, "
Barred Plymouth Rocks	"	" 30, "
Barred Plymouth Rocks	Hens	December, 2, "
White Plymouth Rocks	"	" 2, "

NUMBER OF EGGS LAID DURING THE YEAR.

Table No. 4.

The following is a list of the number of eggs laid during the different months of the year, dating from April 1, 1911, to March 31, 1912.

1911 —	April	3,426
	May	2,639
	June	1,683
	July	1,199
	August	676
	September	566
	October	114
	November	88
	December	676
1912 —	January	1,130
	February	1,615
	March	3,110
	Total	16,922

VISITORS.

During the year we had the pleasure of receiving a large number of visitors. Among them were several expert poultry keepers from England who evinced much interest in Canadian methods of housing, feeding and management. Particular attention was given to the cotton front method of keeping the laying stock during the winter season. Much gratification was expressed at the number of eggs laid under conditions so different to the popular opinion that fowls had to be kept in a warm house during the winter season before a satisfactory egg yield could be secured.

INVESTIGATION INTO POULTRY DISEASES.

The Poultry Division is indebted to Dr. C. H. Higgins, Pathologist, Health of Animals Branch, Department of Agriculture, for his skilful examination of numerous cases of poultry diseases, which from time to time were received by us and submitted to him. From the number of these cases and the fact that they came from widely scattered parts of the Dominion, it is evident that two diseases, viz., Blackhead in turkeys and Tuberculosis among fowls, are the most widespread and fatal, and are creating much havoc among the poultry of the country. Both diseases demand the immediate attention of the proper scientific authorities in the interests of the farmers of the country, who are the principal sufferers. Instances are mentioned by correspondents who state that the rearing of turkeys in their districts has become impossible owing to the prevalence of Blackhead. Dr. Higgins, for some years past, has given much attention to both diseases, and two circulars recently issued by him, one on each of the diseases named, will be read with much interest and benefit.

TABLE No. 5.

STOCK ON HAND ON MARCH 31, 1912.

Pen No.	Breeds.	Cocks.	Hens.	Cockerels.	Pullets.	Total.	Remarks.
1	White Plymouth Rocks	.....	17	1	.....	18	Heated house No. 1.
2	White Wyandottes	.....	10	1	....	11	" " 1.
4	White Leghorns	1	.....	....	29	30	" " 1.
5	Barred Plymouth Rocks	.....	13	1	.....	14	" " 1.
6	Black Minorcas	.....	.....	1	8	9	" " 1.
7	Buff Orpingtons	.....	13	1	...	14	" " 1.
22	Black Minorcas	.....	10	1	.....	11	" " 3.
26	White Leghorns	1	21	.....	.....	22	" " 3.
29	Barred Plymouth Rocks	.....	5	1	.....	6	" " 3.
32	White Wyandottes	1	.....	.....	20	21	Cotton front " 4.
33	Barred Plymouth Rocks	1	.....	.....	26	27	Open " " 5.
34	Buff Orpingtons	1	.....	.....	15	16	" " " 5.
35	White Plymouth Rocks	1	.....	.....	16	17	" " " 5.
36	Barred Plymouth Rocks	.....	24	1	.....	25	" " " 5.
37	" " "	1	.....	.....	14	15	Cotton " " 6.
38	White Wyandottes	1	10	.....	.....	11	" " " 6.
40	Barred Plymouth Rocks	1	....	.....	26	27	" " " 6.
	For breeding purposes	2	2	14	2	20	In different pens.
	Capons	2	....	.....	.....	2	In houses No. 2 & 3.
	Total	13	125	22	156	316	

EXPERIMENTAL STATION FOR PRINCE EDWARD ISLAND

REPORT OF J. A. CLARK, B.S.A., SUPERINTENDENT.

CHARLOTTETOWN, P.E. ISLAND, March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa, Canada.

SIR,—I have the honour to submit herewith the third annual report of the Experimental Station for Prince Edward Island.

I have to report a year of advancement. While the weather conditions were not so favourable as those of the previous year, yet very satisfactory crops were grown. A large amount of improvement work has been done. The grounds have been laid off into lawns, groups of shrubbery and a system of driveways, and the farm divided into plantations and series of rotation experiments. New buildings have been erected and the system of tile drainage extended so as to include practically all the land on the Station in need of drainage at present.

Owing to the very light snowfall of the first three months of 1911, frost entered the ground to a much greater depth than usual. The spring rainfall was light, while that of the growing season for grasses and grains was only 5·58 inches compared with the same period, April-July of 1910, which was 14.3 inches, or very little more than one-third There was no late spring frost. The great depth of frost in the ground conserved the moisture during seeding time so that the crops came on much better than the above figures would indicate.

The spring was very cold and backward. Northeast winds off the ice floes in the Gulf of St. Lawrence kept the air chilly and frost occurred every night in April, up to the 27th. The growth during May was slow until after the severe frost of the 17th when the weather turned warmer. Seeding began at this Station on May 12. The weather during June, July and the first half of August was dry and hot. Heavy wind and rain storms on the 15th and 19th of August did considerable damage, lodging and shelling out much grain before it was ready to cut. After continued rains for a fortnight, the first killing frost occurred on the 29th of September. A large amount of the fall ploughing was done during the exceptionally fine month of October. Over 8 inches of snow fell November 3 and remained several days. This was followed by broken weather, enough snow falling to make good sleighing during the last week of the month. The ground remained bare throughout December. January and February, 1912, were stormy and very cold. On the 10th of March a storm occurred that blocked all traffic. The ice remained good and strong and the winter's hauling is now practically completed.

CROPS ON THE EXPERIMENTAL STATION.

The hay crop was much injured by the night frosts of April and the continued drouth that followed. The western section of the Province fared much better than the eastern, while at this Station the crop was much below the average of several

years, as scarcely any clover wintered. The cereal branch of the work was very satisfactory. Seed was obtained from the members of the Canadian Seed Growers' Association in P. E. Island, and also from members in New Brunswick, and plots were grown along with the uniform test plots. These were carefully rogued by the Secretary of the Association and the Seed Inspector; notes were taken and the members were corresponded with. By this means undesirable seed can be eliminated from plots grown by any member. Multiplying plots of grain were grown at the Station. Pure strains of seed have been sold to members and to men who agree to grow such seed carefully under supervision, to report annually for three years and compare it with that already in their locality. The grain was harvested in good condition and the seed for 1912 is strong in vitality.

The potato crop was about an average in yield and quality. The potatoes have kept sound throughout the winter, there being scarcely any rot reported in this Province.

The vegetables with few exceptions gave most excellent returns. The corn was killed early by a severe frost and only gave fair yields. Roots in general did well; continuous cultivation during the drouth was necessary to secure a full crop.

EXPERIMENTS WITH SPRING WHEAT.

The following uniform test plots of spring wheat were added to the list grown in 1910 which was reported: Two lots of Red Fife from C. E. F. Ottawa, one an early strain and the other grown for the Dominion Chemist, three lots of White Fife furnished by members of the C.S.G.A., and one lot of Selected Goose wheat obtained in Ontario. The land was a sandy loam which had been manured on the sod with barnyard manure at the rate of eight tons per acre during the summer of 1910 immediately after a crop of timothy hay had been removed. The sod was full of couch and, though well worked, the couch was not all killed. The seed was sown on May 13, on one-sixtieth acre plots at the rate of about 1 bushel and 3 pecks to the acre. The plots and paths were seeded down with a mixture of 1 lb. of common Red Clover, 3 lbs. Alsike, 1 lb. White Dutch per acre, and the paths were allowed to grow up, the clover on them being cut for hay in July. The land was not uniform and the couch grass interfered with the growth of some plots more than others. Some rust occurred and the Goose wheat lodged quite badly.

SPRING WHEAT.—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of Straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per Measured Bushel after cleaning.
					Ins.		Ins.	Lbs.	Bush.	Lbs.	Lbs.
1	White Russian	May 13..	Aug. 17..	96	39	9½	3½	1,598	26	38	63
2	Early Red Fife	" 13..	" 15..	94	35	10	2⅝	1,472	24	32	63
3	Huron	" 13..	" 15..	94	37	10	3	1,470	24	30	63.2
4	Stanley	" 13..	" 16..	95	35	10	3	1,470	24	30	62
5	Bishop	" 13..	" 12..	91	35	10	2¼	1,416	23	36	62.5
6	Pringle's Champlain	" 13..	" 17..	96	36	9¾	2	1,406	23	26	63.2
7	Goose (selected) J. L.	" 13..	" 25..	104	39	8½	2	1,395	23	15	63.8
8	White Fife (sel. D.I.A.)	" 13..	" 17..	96	38	9½	3	1,389	23	9	62.5
9	Red Fife (extra)	" 13..	" 17..	96	38	10	2⅓	1,384	23	4	62.5
10	Marquis	" 13..	" 12..	91	34	10	2¼	1,342	22	22	63.5
11	White Fife (sel. P.M.)	" 13..	" 17..	96	37	10	2⅝	1,331	22	11	62.5
12	Chelsea	" 13..	" 12..	91	38	10	3	1,324	22	4	62.5
13	White Fife (sel. G. Mc.)	" 13..	" 17..	96	36	9¾	3	1,301	21	41	61.5
14	Preston	" 13 .	" 14..	93	38	9½	2⅜	1,286	21	26	62.5
15	Red Fife	" 13..	" 17..	96	37	10	2⅓	1,226	20	26	62.5
16	White Fife	" 13..	" 18..	97	38	10	2½	1,159	19	19	63.0
17	Colorado Bearded	" 13..	" 14.	93	40	9	2½	992	16	32	63.0
18	Bobs	" 13..	" 14..	93	30	10	2¼	885	14	45	62.0
19	Goose	" 13..	" 23 .	102	36	8	2¼	726	12	6	62.8

FIELD LOTS OF SPRING WHEAT.

Three field plots of spring wheat were grown. The seed for one half acre of Red Fife and one quarter acre White Fife was obtained pure from Ottawa. An acre and one quarter was sown with Marquis wheat; the seed of this was obtained from Ottawa in 1910. This grain was carefully rogued during the summer, and is being sold to grain growers as foundation stock.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of Straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	
					Ins.		Ins.	Lbs.	Bush.	Lbs.
1	*Marquis	May 12..	Aug. 11..	91	38	10	2¼	1,478	24	38
2	†Red Fife	" 17..	" 21..	96	40	10	2⅜	1,922	32	2
3	‡White Fife	" 17..	" 21..	96	39	10	2⅜	1,368	22	48

*1·25 acre, †·5 acre and ‡·25 acre.

EXPERIMENTS WITH OATS.

The land available for the uniform test plots of oats was unsatisfactory and the results are not reliable as comparative tests. The soil was a sandy loam. It received 8 tons of barnyard manure; this was spread on the sod in 1910. Several bad patches of couch interfered with the growth of many of the plots. Twenty-seven plots of one-sixtieth of an acre each, were sown on May 15 at the rate of two bushels and two pecks per acre.

OATS—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per Measured Bushel after cleaning.
					Inch.		Inch.	Lbs.	Bush.	Lbs.	Lbs.
1	White Giant	May 15...	Aug. 13...	90	42	9¾	8½	2861	84	5	32.2
2	Banner (Sil. T. W.)	" 15...	" 11...	88	43	10	8¼	2794	82	6	35
3	Siberian	" 15...	" 13...	90	40	9½	7½	2680	78	28	34
4	Lincoln	" 15 ..	" 14...	91	41	9½	8	2674	78	22	36
5	Old Island Black	" 15...	" 9...	86	40	9½	9	2618	77	..	35.5
6	Swedish Select	" 15...	" 12...	89	42	9	6½	2597	76	13	37
7	Ligowo, Improved	" 15...	" 13...	90	45	10	8	2558	75	8	37.5
8	Virginia White	" 15...	" 9...	86	40	10	7	2535	74	19	36
9	Twentieth Century	" 15...	" 13...	90	46	10	8½	2490	73	8	36.5
10	Victory	" 15...	" 15 ..	92	45	10	8½	2439	71	25	37.5
11	Daubeney, (G)	" 15...	" 2...	79	40	10	6	2273	66	29	33
12	Thousand Dollar	" 15...	" 11...	88	43	10	8½	2239	65	29	37.5
13	Golden Beauty	" 15...	" 13...	90	38	9	7¼	2239	65	29	34.2
14	White Egyptian	" 15...	" 11...	88	39	10	8	2209	64	33	39.5
15	Early Blossom	" 15...	" 12...	89	38	9	7	2179	64	3	37.5
16	Daubeney, Sel	" 15...	" 2...	79	33	10	5½	2176	64	..	34.5
17	Improved American	" 15...	" 13...	90	40	10	8	2175	63	33	34
18	Abundance	" 15...	" 13...	90	40	10	8	2175	63	33	34.5
19	Gold Rain	" 15...	" 12...	89	41	10	7	2162	63	20	37.5
20	Wide Awake	" 15...	" 14..	91	37	9¾	7½	2058	60	18	35
21	Danish Island	" 15...	" 12...	89	41	9½	9	2052	60	12	33
22	Abundance, Gar. Reg	" 15 ..	" 12...	89	40	9½	8	2023	59	17	37
23	Pioneer (Black)	" 15...	" 8...	85	34	10	6½	1952	57	14	37
24	Banner	" 15...	" 12...	89	39	9¾	9	1928	56	24	33
25	Excelsior (Black)	" 15...	" 9...	86	34	9¾	7½	1906	56	2	39
26	Ligowo (Swedish)	" 15...	" 11...	88	38	10	6½	1789	52	21	37
27	Irish Victor	" 15...	" 14...	91	36	10	6½	1766	51	32	33

FIELD PLOTS OF OATS.

Selected seed was obtained from Ottawa and five field plots of oats were sown on May 20. The land received about eight tons of manure per acre the previous year. The sod was ploughed in the autumn of 1910 and many of the weeds killed by frequent discing with the cut-away harrow. The seed was sown at the rate of two bushels per acre. These plots were carefully rogued and the weeds in them were pulled. The seed from them is being sold to farmers for foundation stock.

FIELD PLOTS—OATS—Test of Varieties.

Number.	Name of Variety.	Size.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.
						Ins.		Ins.	Lbs.	Bush. Lbs.
1	Banner	2 acres	May 20	Aug. 14	86	44	9	8½	2,768	81 14
2	Daubeney	·125 "	" 20	" 18	90	34	9½	6	1,568	46 4
3	Victory	·25 "	" 20	" 18	90	42	10	8½	1,520	44 24
4	Gold Rain	·25 "	" 20	" 18	90	41	10	7	1,508	44 12
5	Ligowo	·25 "	" 20	" 18	90	39	10	7	1,468	43 6

EXPERIMENTS WITH BARLEY.

Experiments were conducted with 22 varieties of barley (12 six-row and 10 two-row) in plots of one-sixtieth of an acre each. The land had a dressing of 8 tons barnyard manure applied on the sod in 1910, after a crop of timothy hay had been removed. The plots of six-row barley were sown May 18 and the two-row on May 19, at the rate of two bushels per acre. A mixture of 6 lbs. Common Red clover, 3 lbs. Alsike, 1 lb. White Dutch and 10 lbs. Timothy seed per acre was sown on the paths and plots. The grass on all the paths about the plots was allowed to grow. It was cut for hay in July. The Swedish Chevalier was a little weak in the straw.

SIX-ROW BARLEY—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per Measured Bushel after Cleaning.
					Ins.		Ins.	Lbs.	Bush. Lbs.	Lbs.
1	Nugent	May 18	Aug. 9	83	37	10	3	2,915	60 35	48·0
2	O. A. C. No. 21	" 18	" 7	81	37	10	2¾	2,568	53 24	46·2
3	Claude	" 18	" 7	81	33	10	2½	2,490	51 42	47·0
4	Albert	" 18	" 6	80	35	10	3¼	2,430	50 30	46·5
5	Odessa	" 18	" 7	81	36	10	2¾	2,196	45 36	47·0
6	Stella	" 18	" 7	81	32	10	2½	2,156	44 44	
7	Manchurian	" 18	" 8	82	34	10	2½	2,084	43 20	46·2
8	Oderbruch	" 18	" 9	83	32	10	2½	1,999	41 31	47·0
9	Yale	" 18	" 9	83	37	10	2½	1,909	39 37	51·0
10	Trooper	" 18	" 7	81	31	10	2	1,819	37 43	48·0
11	Mensury	" 18	" 8	82	38	10	2½	1,793	37 17	51·5
12	Mansfield	" 18	" 8	82	27	10	2¼	1,718	35 38	46·0

TWO-ROW BARLEY—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per Measured Bushel after Cleaning.
					Ins.		Ins.	Lbs.	Bush. Lbs.	Lbs.
1	Swedish Chevalier..	May. 19	Aug. 12	85	33	8	3½	2,404	50 4	52·0
2	Standwell.....	" 19	" 10	83	44	10	3½	2,195	45 35	52·5
3	Invincible..	" 19	" 11	84	38	10	3	2,175	45 15	52·4
4	French Chevalier...	" 19	" 8	81	36	10	2½	2,134	44 22	53·0
5	Danish " ...	" 19	" 9	82	37	10	3½	2,107	43 43	52·0
6	Canadian Thorpe...	" 19	" 10	83	38	10	3	2,078	43 14	52·5
7	Jarvis.....	" 19	" 9	82	48	10	4	2,021	42 5	51·2
8	Clifford.....	" 19	" 8	81	40	10	3¼	2,000	41 32	51·4
9	Beaver.....	" 19	" 7	80	46	10	4	1,970	41 2	48·0
10	Hannchen.....	" 19	" 9	82	31	9½	2	1,867	38 43	52·2

FIELD PLOTS OF BARLEY.

One-half acre of Manchurian and one-quarter acre of Hannchen barley were sown with seed obtained from the Cerealist at Ottawa. The Hannchen rusted quite badly and was weak in the straw. Heavy wind storms shook out much of the grain before harvest.

FIELD PLOTS OF BARLEY—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.
					Ins.		Ins.	Lbs.	Bush. Lbs.
1	Manchurian (area, ·5 acres)..	May 29	Aug. 18	81	34	10	2½	1,604	33 20
2	Hannchen (" ·25 ")..	" 29	" 21	84	28	6	2	1,440	30 00

EXPERIMENTS WITH PEAS.

Twelve varieties of peas were tested on one-sixtieth acre plots. The land was a sandy loam; it had grown a heavy crop of oats in 1910. It was manured and a crop of potatoes grown on it in 1909. After being well worked with the cut-away harrow the plots were sown on May 24 at the rate of two bushels per acre. The vines made a very strong growth early in the season and good harvest weather ripened the plots quite uniformly. The peas were injured somewhat by the pea moth (*Semasia nigricana Stepp.*) which for years has been very abundant in this Province.

PEAS—Test of Varieties.

Number.	Name of Variety.	Size of Pea.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average length of pod.	Yield of Grain per acre.	Yield of Grain per Acre.	Weight per Measured Bushel after Cleaning.
						In.	Lbs.	Bush. Lbs.	Lbs.
1	Prince	Large	May 24	Aug. 31	99	2½	3,148	52 58	61·8
2	Prussian Blue	Medium	" 24	" 31	99	2¼	3,073	51 13	62·2
3	White Marrowfat	Large	" 24	" 31	99	2½	2,924	48 44	61·5
4	Black-eye Marrowfat	Medium	" 24	" 31	99	2½	2,840	47 20	61·8
5	Picton	"	" 24	" 31	99	2½	2,684	44 44	62.2
6	Golden Vine	Small	" 24	" 31	99	2	2,649	44 9	65·5
7	Paragon	Medium	" 24	" 31	99	2½	2,641	44 1	62·5
8	English Grey	"	" 24	" 31	99	2½	2,632	43 52	60·0
9	Daniel O'Rourke	Small	" 24	" 31	99	2¼	2,544	42 24	63·0
10	Arthur (Sel.)	Medium	" 24	" 23	91	2¼	2,511	41 51	62·0
11	Mackay	"	" 24	Sept. 2	101	2½	2,388	39 48	61·5
12	Chancellor	Small	" 24	Aug. 25	93	2	2,237	37 17	63·0

EXPERIMENTS WITH CEREALS ON SWAMP LAND WITH DIFFERENT APPLICATIONS OF LIME.

A portion of a black muck swamp underlaid with 3 feet of peat which had been tile drained in 1910 was laid off into one-fortieth acre plots and sown with buckwheat at 1⅛ bushels per acre, wheat at 1¾ bushels, oats at 2½ bushels per acre, barley at 2 bushels per acre, peas at 2 bushels per acre and vetches at 1 bushel per acre on June 17. The clearing and burning had prevented earlier seeding. The land was laid off into four strips 33 feet wide each, parallel with the road to St. Avards. These strips were treated as follows:—

No. 1. Had no application of lime.
No. 2. Had 5 bbls. lime per acre.
No. 3. Had 10 bbls. lime per acre.
No. 4. Had 20 bbls. lime per acre.

Each kind of grain was sown across these strips making each plot of the experiment one-fortieth of an acre in area. Certain irregularities will be noticed, as large piles of brush and stumps had been burned on the ground, leaving under them a considerable quantity of potash, etc., which neutralized the swamp acids and gave bunches of strong, healthy grain. The peas and vetches started well, then died down and did not mature.

TEST OF LIME ON SWAMP—Cereals Grown 1st year after Clearing.

Number.	Name of Cereal.	Date of Sowing.	Date When Cut.	No. of Days Maturing.	Bbls. of Lime per acre	Condition When Cut.	Plots influenced by ashes of stumps.	Total Yield of Grain and Straw per acre.	Yield of Grain per acre.	
							Amount	Lbs.	Bush.	Lbs.
Plot 1	Buckwheat	Jun 17	Sep 7							
" 2	"	" 17	" 7		5 bbls.	½ Ripe	none	3800	14	8
" 3	"	" 17	" 7		10 "	"	marked	5133	17	11
" 4	"	" 17	" 7		20 "	"	slight	5133	15	.
" 1	Wheat (White Fife)	" 17	" 8	83	none	Soft	none	5400	20	26
" 2	"	" 17	" 8		5 bbls.	"	marked	3100	14	20
" 3	"	" 17	" 8		10 "	"	"	3340	15	20
" 4	"	" 17	" 8		20 "	"	slight	3330	15	10
" 1	Oats (Banner)	" 17	" 8	83	none	Ripe	none	2300	9	50
" 2	"	" 17	" 8		5 bbls.	"	marked	1820	19	14
" 3	"	" 17	" 8		10 "	"	slight	2240	25	10
" 4	"	" 17	" 8		20 "	"	none	3120	24	24
" 1	Barley	" 17	" 4	79	none	"	"	4500	49	14
" 2	"	" 17	" 4		5 bbls.	"	slight	130	..	40
" 3	"	" 17	" 4		10 "	"	none	1560	11	42
" 4	"	" 17	" 4		20 "	"	"	1440	10	30
" 1	Rye	" 17	" 8	83	none	Soft	"	3000	23	36
" 2	"	" 17	" 8		5 bbls.	"	"	180	1	24
" 3	"	" 17	" 8		10 "	"	"	960	5	20
" 4	"	" 17	" 8		20 "	"	"	1080	7	48
								4200	27	6

EXPERIMENTS WITH INDIAN CORN.

Ten varieties of Indian corn were grown for ensilage. Eight tons of manure per acre was applied to sod in 1910, this was ploughed under and well worked. Three tons of manure was applied before planting and worked into the soil with the disc harrow. The corn was sown with a grain drill in rows thirty-six inches apart, on June 7, 1912, and cut green on September 21, shortly after a heavy frost which had killed it. It was cured as corn stover and fed to stock during the winter.

The yields were computed from two inside rows, the plots being one-hundredth of an acre in area.

INDIAN CORN FOR ENSILAGE—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Cutting.	Average Height.	Condition when cut.	Weight per Acre grown in rows.	
				In.		Tons.	Lbs.
1	Superior Fodder	June 7	Sept. 21	90	In silk	18	..
2	Compton's Early	" 7	" 21	75	Tasselled	15	1,000
3	Woods' Northern Dent	" 7	" 21	84	In silk	13	1,100
4	Early Mastodon	" 7	" 21	69	In silk	13	..
5	Longfellow	" 7	" 21	72	Early milk	12	100
6	Angel of Midnight	" 7	" 21	72	Soft glazed	11	1,700
7	Eureka	" 7	" 21	81	Tasselled	11	1,300
8	Selected Leaming	" 7	" 21	78	Tasselled	10	1,700
9	Canadian Yellow, (Sel. N.S.C.A.)	" 7	" 21	58	Firm dough	10	100
10	Longfellow (Sel. F. G.)	" 7	" 21	58	Early dough	7	800

FIELD ROOTS.

EXPERIMENTS WITH TURNIPS.

Thirteen varieties of Swede turnips were tested on a clay loam. This land appeared to be dry but proved to be in need of drainage. The soil baked during the hot weather of July and August and then was too wet when the rain came later in the season. A timothy sod was top-dressed in August, 1910, with 8 tons barnyard manure and ploughed under; this was well worked in the spring and 10 tons additional manure was worked into the land. The seed was sown in drills two and one half feet apart and the young plants thinned to about fourteen inches apart in the rows. The seed was sown May 22 and the roots pulled on November 9. The yields were computed from one-hundreth acre plots.

TURNIPS—Test of Varieties.

Number.	Name of Variety.	Yield per Acre 1st Sowing.		Yield per Acre 1st Sowing.	
		Tons.	Lbs.	Bush.	Lbs.
1	Webb's (Home-grown)	17	1,400	590	..
2	Hall's Westbury	15	775	512	55
3	Good Luck	15	125	502	5
4	Magnum Bonum	15	100	501	40
5	Hazard's Improved	13	1,300	455	..
6	Mill Pond	13	1,100	451	40
7	Jumbo	13	1,025	450	25
8	Hartley's Bronze	13	775	446	15
9	Perfection Swede	13	675	444	35
10	Halewood's Bronze Top	13	50	434	10
11	Bangholm Selected	12	1,825	430	25
12	Carters' Elephant	12	1,350	422	30
13	Mammoth Clyde	11	1,050	384	10

EXPERIMENTS WITH CLUB-ROOT OF TURNIPS.

Experiments outlined by the Division of Botany, C.E. Farm.

Land that was badly infested with 'Club Root' in 1910 was chosen. It was divided into plots of 1/20 of an acre from west to east.

Plot I, received no treatment.
Plot II, received 150 bushels unslaked lime per acre.
Plot III, " 100 " " "
Plot IV, " 75 " " "

These were sown in sections of 1/60 acre each from north to south.

Section 1. Sown June 30, 1911.
Section 2. Sown June 15, 1911.
Section 3. Sown June 1, 1911.

Hall's Westbury was the seed sown on all plots. They were harvested November 11, 1911. Barnyard manure at the rate of 20 tons per acre was applied.

Plot No.	Section.	Sound Turnips.		Diseased Turnips.		Rotten Turnips.		Total Turnips.	
		Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.
1	No 1	373	4	272	..	16	4	661	8
1	" 2	179	..	438	12	5	4	623	..
1	" 3	168	..	568	.	24	8	760	8
								2,045	.
2	No. 1	571	8	221	..	...	9	793	1
2	" 2	632	..	89	..	...	..	721	..
2	" 3	800	..	156	8	15	9	972	1
								2,486	2
3	No. 1	723	14	74	..	...	..	797	14
3	" 2	741	15	126	..	1	1	869	..
3	" 3	867	..	123	12	4	14	995	10
								2,662	8
4	No. 1	669	..	212	12	1	1	882	12*
4	" 2	580	..	300	8	33	..	913	8
4	" 3	575	..	39	..	...	..	614	..
								2,410	..
	Sections	1		2		3			
	Totals	Lbs. 3,135	Ozs. 3	Lbs. 3,126	Ozs. 8	Lbs. 3,342	Ozs. 3	Lbs. 9,603	Ozs. 14

*Plot 4, Section 1 had the outside row completely killed by "Club Root," the lime was harrowed in from this row.

Club-root Experiment—Test of Varieties.

season, 1911.

No.	Name.	Sound Turnips.			Diseased Turnips.			Rotten Turnips.			Total Turnips.		
		No.	Lbs.	Oz.	No.	Lbs.	Oz.	No.	Lbs.	Oz.	No.	Lbs.	Oz.
1	Bangholm Selected	4	10	13	3	7	7	10	6	12	17	24	9
2	Carter's Elephant	2	7	13	16	33	5	16	14	73	34	55	9
3	Good Luck	6	18	2	46	119	8	41	39	..	93	176	10
4	Halewood's Bronze Top	2	6	1	14	36	..	40	48	..	56	90	1
5	Hall's Westbury	9	39	11	40	97	12	27	35	..	76	172	7
6	Hartley's Bronze	70	223	4	25	43	2	11	17	..	105	283	6
7	Jumbo	0	.....	.....	21	51	4	39	56	8	60	107	12
8	Magnum Bonum	13	65	9	18	72	8	34	61	..	65	199	11
9	Mamuoth Clyde	0	.. ..		3	8	13	46	59	..	49	67	13
10	Perfection Swede	39	148	5	6	25	11	23	31	..	68	205	..
11	Webb (P.E.I. Seed)	21	74	9	10	22	..	31	38	..	62	134	9
12	Hazard's Improved Cr	0	.....		4	5	4	15	22	2	19	27	6
13	Mill Pond	0	.....		8	10	3	26	18	8	24	28	11
14	" "	0	.....	.....	2	4	15	10	11	2	12	15	15
15	" "	0	....	.....	16	26	8	17	17	7	33	43	15

The above varieties were sown on June 30, on land which was known to be very badly infested with 'Club-root.' The turnips grown on it in 1910 were almost all

diseased. The variety known as Mill Pond was recommended to me as being immune. I gave it three rows and the results are recorded above.

In 1910 No. 8 was 1st, No. 3, 2nd, No. 6, 3rd, and No. 10, 9th, in a similar test.

EXPERIMENTS WITH MANGELS.

Eight varieties of mangels were sown on May 15 on land that had grown turnips in 1910. Fifteen tons of manure was thoroughly worked into the soil and the seed sown in drills thirty inches apart. The young plants were thinned to about 12 inches apart in the rows. The yields were computed from one-hundredth acre plots. The plots were pulled October 14.

MANGELS—Test of Varieties.

Number.	Name of Variety.	Yield per Acre — 1st Sowing.		Yield per Acre — 1st Sowing.	
		Tons.	Lbs.	Bush.	Lbs.
1	Selected Yellow Globe	36	1,103	1,218	23
2	Giant Yellow Globe	36	633	1,210	33
3	Yellow Intermediate	34	268	1,137	48
4	Gate Post	34	161	1,136	1
5	Giant Yellow Intermediate	33	...	1,100	..
6	Perfection Mammoth Long Red	31	1,366	1,056	6
7	Prize Mammoth Long Red	31	1,327	1,055	27
8	Half Sugar White	31	171	1,036	11

EXPERIMENTS WITH FIELD CARROTS.

Five varieties of carrots were tested on land that had grown potatoes in 1910. The land was prepared in the same way as for the other roots. The yields were computed from one-hundredth acre plots. The seed was sown May 15, and the roots pulled October 20. The yields were disappointing compared with the tops, which were very strong.

CARROTS—Test of Varieties.

Number.	Name of Variety.	Yield per Acre — 1st Sowing.		Yield per Acre — 1st Sowing.	
		Tons.	Lbs.	Bush.	Lbs.
1	Mammoth White Intermediate	10	909	365	9
2	Improved Short White	9	1,275	321	15
3	Half Long Chantenay	8	1,696	296	36
4	Ontario Champion	8	1,097	286	37
5	White Belgian	8	889	281	20

EXPERIMENTS WITH SUGAR BEETS.

Three varieties of sugar beets were sown under the same conditions as the mangels and in rows alongside of them. They were grown to ascertain their sugar

content, which, from the analysis made by the Dominion Chemist and included in the following table, shows that the beets were of very good quality and high in sugar. They were sown May 17 and pulled October 14.

SUGAR BEETS—Test of Varieties.

Number	Name of Variety.	Yield per acre, 1st Sowing.		Yield per acre, 1st Sowing.		Yield per acre, 2nd Sowing.		Yield per acre, 2nd Sowing.	
		Tons	Lbs.	Bush	Lbs.	Tons	Lbs.	Bush.	Lbs.
1	French Very Rich	21	438	707	18	16	452	540	52
2	Klein Wanzleben	20	1794	696	34	16	1888	564	48
3	Vilmorin's Improved	17	848	580	48	17	1719	595	19

PARTICULARS re SUGAR CONTENT.

—	Vilmorin's Imp'd.		Wanzleben.		Very Rich.	
	Sown May 17	Sown June 5	Sown May 17	Sown June 5.	Sown May 17.	Sown June 5
Average weight one root.	1 lb.11 oz.	1 lb.10 oz.	2 lbs.4 oz.	1 lb.12 oz.	1 lb.9 oz.	1 lb.15 oz.
Total solids in juice ...	21·24	19·64	13·64	18·44	18·17	16·04
Sugar in juice	18·36	17·09	16·91	16·34	16·41	13·98
Coefficient of purity.....	86·4	87·0	90·7	89·1	90·3	87·1

EXPERIMENTS WITH POTATOES.

Nothwithstanding the long continued drought of the early summer the potato crop was about an average one in yield. The potatoes were of excellent quality and were free from rot. Scarcely any specimens have rotted in the cellars.

A strong growth of alfalfa was turned down and the land thoroughly worked two weeks before the potatoes were planted in a sandy loam that was quite mellow. A complete fertilizer at the rate of 800 lbs. per acre was applied to the surface after the seed was planted and harrowed in. It was mixed as follows: 250 lbs. nitrate of soda, 350 lbs. superphosphate and 200 lbs. muriate of potash.

The potatoes were planted May 23 and dug October 2. The yields were computed from one two-hundred-and-fortieth acre plots. The seed was cut with two eyes in each set and soaked in a solution of formalin of 1 pint to 40 gallons water for one half an hour. The potatoes were planted in rows 30 inches apart, the sets being one foot apart in the rows. The freshly cut sets were covered with slaked lime.

The plants received five sprayings with Paris green and on July 27, August 10 and August 24 the Bordeaux mixture was added to prevent blight.

Not Liming vs. *Liming (freshly cut Sets).*

A duplicate was planted with each of the variety test plots. The only change made was that the liming of the freshly cut sets was omitted.

Fifteen varieties showed an average loss of 31 bushels 47 lbs. (per acre).

Six varieties showed an average gain of 26 bushels 34 lbs. (per acre).

Net average loss on the 21 varieties, 15 bushels 49 lbs. (per acre).

POTATOES—Test of Varieties

Number.	Name of Variety.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
1	Bliss Triumph	330	49	330	49	309	39	21	10	Round pink
2	Burbank's Seedling	308	..	308	..	283	48	24	12	Long white
3	American Wonder	305	15	305	15	261	48	43	27	" "
4	Clark's No. 1	299	12	299	12	283	48	15	24	" "
5	Money Maker	289	51	289	51	256	18	33	33	Round "
6	Late Puritan	279	57	279	57	244	12	35	45	Long "
7	Carman No. 1	261	48	261	48	233	12	28	36	Round "
8	McIntyre	243	39	243	39	213	24	30	15	Long blue
9	Dreer's Standard	238	42	238	42	217	48	20	54	Round white
10	Vick's Extra Early	232	32	232	32	202	24	29	58	Long "
11	Morgan Seedling	223	1	223	1	187	..	36	1	" "
12	Rochester Rose	213	24	213	24	182	19	31	5	" pink
13	Ashleaf Kidney	209	49	209	49	184	48	25	1	Round white
14	Reeves' Rose	207	54	207	54	159	30	48	24	Long pink
15	Factor	207	54	207	54	152	21	55	33	" white
16	Empire State	207	21	207	21	184	48	22	33	" "
17	Dalmeny Beauty	198	50	198	50	156	12	42	38	Oval "
18	Gold Coin	195	31	195	31	182	36	12	55	Round "
19	Hard to Beat	193	52	193	52	146	18	47	34	" "
20	Irish Cobbler	167	45	167	45	144	55	22	50	" "
21	Everett	141	21	141	21	122	55	18	16	Oval "

FORAGE CROPS.

Four and one half acres of new meadow produced nine tons, fourteen hundred and sixty lbs. of timothy hay, the clover having been killed out during the frosts of April. One and three quarter acres of three year old meadow gave three tons sixteen hundred and eighty five lbs. timothy hay. One and one half acres of the Beer property (not yet transferred to the Experimental Station) gave ten hundred and seventy lbs. of very weedy hay.

Three quarters of an acre of alfalfa sown July 16, 1910, gave a yield in 1911 of one ton six hundred and sixty pounds. The other plots of clover and alfalfa were so badly winter-killed that they were ploughed up.

One sixth of an acre of Western Woltz grass (Italian Rye grass) was sown May 16, 1911. It was cut August 9 giving a yield of five hundred and seventy-two pounds, equal to one ton fourteen hundred and thirty two pounds per acre. When cut the grass was ripe, the harrow was run over the plot on August 16, to cover what had shelled out, and a strong second crop sprung up which appears to have come through the winter well.

Three bushels of seed were threshed from this plot of annual grass on Aug. 12. The grass was of fine quality and made fairly good hay.

BUILDINGS.

A basement barn 40 ft. x 60 ft. with an eight-foot basement and a 16 ft. post was built 50 feet to the west of the machine shed. The foundation of the barn, including a fruit cellar under the south approach and a root cellar under the north approach, was made of concrete. The superstructure is of wood, the frame above the basement being entirely constructed of planks. The gambrel roof, which is supported by plank trusses, is boarded in with six-inch boards laid three inches apart. Cedar shingles on the roof are laid four and one-half inches to the weather so that two rows of nails come on each board.

The basement has six horse stalls, four steer pens, a lavatory, a harness-room and a work shop. On the barn floor there is a large hay mow on the east of the driveway, while on the west there is a feed room, a sample room, a granary and a threshing floor. Above there is a large straw-mow 30 x 40 feet.

A compact, roomy foreman's house 28 x 32 feet was constructed to the east of the Superintendent's residence. This house was designed to illustrate a compact farm house with many useful conveniences that have only to be seen to be appreciated.

TILE DRAINAGE.

The system of tile drains commenced the previous season near the De Blois Road at the north of the farm was completed by laying 5,800 feet of 3-inch laterals to the main drain leading north. These drains were laid on 33-foot centres and drained 4·4 acres of land.

GENERAL WORK.

The lawns and roads have been much improved and several new roads were made which save labour and add to the convenience of visitors. The pond at the De Blois Road was graded and sand hauled and mixed with the brick clay to make it tillable.

HORSES.

No change was made among the horses during the year. There are three draft horses, one carriage horse and a draft colt. All have been in good condition throughout the year.

STEERS.

Two steers were purchased January 1, 1912, in order that the roughage produced right be used on the farm. During the 90 days to March 30, their average gain was two lbs. each per day.

EXPERIMENT IN FATTENING LAMBS.

Thirty lambs were purchased and a test conducted to gain information regarding the value of roughage in fattening lambs. The lambs were grade Leicesters in good, thrifty condition, but were badly infested with ticks. They were dipped a few days before the test began and once during the test and this set them back considerably. On the morning of January 1, 1912, they were put on test. The experiment continued 90 days.

Each lamb of each group received 4 ozs. of grain, (oats, barley and peas equal parts) the first day. This was increased at the rate of one hundreth of a lb. per lamb per day throughout the whole period with Lot 1, while Lot 2 and 3 received the same increase as long as they would take it. Lambs Nos. 13, 17, 21 and 22 had a distemper for a time and went off their feed. This reduced their grain ration. These two lots were fed all the grain they would eat.

As roughage, Lot 1 were given alfalfa clover hay; Lot 2 were fed as much mixed hay (80 per cent. timothy) and corn stover as they would eat. They began with about equal parts of hay and stover for January. During February they ate three parts hay to four parts corn stover, while in March they dropped off from the corn stover until at the close they ate four parts hay to one of stover. Lot 3 were fed what timothy hay and turnips they would take in the proportion of about 7 of hay to 8 of roots.

The lambs were fed about 8 a.m., at noon and about 5 o'clock in the evening. They ate very little of their bedding, which was of oat straw.

LAMB FEEDING EXPERIMENTS—Table of Weights and Gains—A. .

Tag Number.	First Weight.	Last Weight.	Total Gain.	Daily Gain per Lamb.
Lot. 1.	Lbs.	Lbs.	Lbs.	Lbs.
No. 1	103½	124¾	21¼	·24
2	107⅓	135	27½	·30
3	92	100¾	8¾	·09
4	86¾	102¼	15⅝	·17
5	83	100½	17½	·19
6	80½	88⅝	8½	·09
7	80¼	92¼	12	·13
8	75¼	97	22¼	·24
9	69	85¼	16¼	·18
10	70½	83	12¼	·13
Total	858¼	1,019½	161¾	1·76
Average	85·8	101·9	16·1	·17
Lot 2.				
No. 11	101½	113½	12	·13
12	98	114½	16½	·18
13	89½	89½	¼	....
14	90¾	98½	7¾	·08
15	84½	94½	10	·11
16	79½	81¼	1¾	·02
17	85	85¼	¼	....
18	79¾	85½	6¾	·07
19	74	85¾	11¾	·13
20	70½	81	10½	·11
Total	852¾	929¼	77½	·83
Average	85·2	92·9	7·7	08

LAMB FEEDING EXPERIMENTS—Table of Weights and Gains—A—*Continued.*

Tag Number.	First Weight.	Last Weight.	Total Gain.	Daily Gain per Lamb.
Lot 3.				
No. 21	75	74	*1	....
22	79	80½	1½	·01
23	79⅓	90⅔	11	·12
24	82	88¾	6¾	·07
25	85	99	14	·15
26	88	107	19	·21
27	74½	82¼	8¼	·10
28	84	90¼	6¼	·07
29	68	78¼	10¼	·11
30	74¾	79	4¼	·04
Total	789⅓	869¾	80¼	·88
Average	78·9	86·9	8	·08

TABLE OF WEIGHTS AND GAINS—B.

Date of Weighing.	Lot 1.		Lot 2.		Lot 3.	
	Total Weight by Lots.	Gain per Lamb per Day.	Total Weight by Lots.	Gain per Lamb per day.	Total Weight by Lots.	Gain per Lamb per Day.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
January 1	853¼	....	852¾	·03	789½	....
" 20	847¼	·05*	858	·09	794¾	·02
February 19	874¼	·12	878¾	·09	813	·09
March 1	932	·34	897	·08	798	·07*
" 20	989¾	·34	913¾	·15	848¾	·26
" 30	1,019½	·29	929¼	....	869¾	·21
		1·09		·44		·58

NOTE.—* Indicates loss.

GENERAL STATEMENT.

CLOVER HAY VS. MIXED HAY AND CORN STOVER VS. TIMOTHY HAY AND TURNIPS.

	Lot 1.	Lot 2.	Lot 3.
Number of lambs	10	10	10
Number of days in experiment	90	90	90
Total weight at beginning of experiment	858¼	852¾	789½
Total weight at end of experiment	1019½	929¼	869¾
Gain per period	161¼	76½	80¼
Gain per head	16	7½	8
Gain per head per day	·18	·085	·09
Quantity of grain eaten by lot for period	597	586	480
Quantity of clover hay " "	2682	....	....
Quantity of timothy hay " "	....	....	1492
Quantity of mixed hay " "	....	1384	....
Quantity of corn stover " "	....	1491	....
Quantity of turnips " "	....	....	1836
Total cost of feed	$15.36	$12·09	$11·85
Cost of feed per head	1.53	1·20	1·18
Cost of feed per head per day (cents)	1.07	1·34	1·18
Cost to produce a lb. of gain (cents)	9.05	18·6	14·75
Value of lambs at commencement at 4½c per lb. live weight	38·62	38·37	35.53
Value at commencement plus cost of feed	53·98	50·46	47.38
Sold at 6c per lb. live weight	61·17	55·75	....
Sold at 5c " "	....	....	43 49
Net profit on lot	7·19	5.29	3 89*
Net profit on lamb	·71	·53	·39*

* Loss.

In calculating cost of feeding the following prices were charged:—

Roots (turnips)	$2.00 per ton.
Corn stover	2.00 "
Hay (clover)	7.00 "
Hay (mixed)	7.00 "
Hay (timothy)	7.00 "
Grain (mixed)	20.00 "

The test would indicate the very valuable feeding qualities of clover hay for fattening lambs. The demand for fat lambs in April exceeds the supply.

HORTICULTURE.

Quite a large percentage of the Experimental Station area is devoted to horticulture.

LARGE FRUITS.

The orchards of large fruits made excellent growth and wintered well. A few trees in the old orchard bore a medium crop of excellent apples. Two applications of lime-sulphur spray cleaned off many of the bark insects from these trees.

SMALL FRUITS.

A number of the small fruits came into bearing. The purple and red raspberries produced good fruit of large size. The black-cap raspberries were badly injured by anthracnose and most of them will have to be destroyed. Nine varieties of grapes produced clusters that matured. Currants, gooseberries and strawberries gave fair returns.

TREES AND SHRUBS.

The belt of ornamental trees and shrubs was completed along the railway front and many varieties were added to the lawns and driveways.

VEGETABLES.

The vegetable garden is situated opposite the residence near the Mount Edward Road. A great many varieties of the common vegetables were tested. This garden proved to be of great interest to visitors and much valuable information has been gained from it.

RECORDS.

A very complete system of horticultural records was commenced in the spring of 1911. Every tree, shrub, vegetable and flower is examined from time to time throughout the year, and notes recorded giving annual growth, hardiness, general condition, diseases and other items. Among these are many minute details which apply to the different classes, as the dates the flowers open, their period of full bloom and when their bloom is over. These are at the Experimental Station at Charlottetown where they may be examined by those interested. Copies are sent annually to the Central Experimental Farm at Ottawa.

FLOWERS.

The flowers, to many, are the most attractive feature on the Farm. Throughout the whole season, from when the snow left until its return, a most beautiful display of choice flowering plants greeted every one who visited the Station buildings. Many hundreds of the choicest varieties of tulips, narcissi, and crocuses, with squills and other bulbs, sent up their delicate flowers during the early spring.

A four-foot border of annuals extends most of the way from the residence to the Mount Edward Road. On the eastern lawn are groups of perennials comprising irises, paeonies, roses, asters, dahlias and many others which make a beautiful showing, while back of them fifty or more varieties of sweet peas make a veritable wall of beauty until the late autumn. In the pond to the west of the buildings varieties of southern water lilies brighten the surface, while around the edge Japanese irises have been planted. In all, more than four hundred perennials or groups of annuals were grown.

AGRICULTURAL MEETINGS AND FARMER'S INSTITUTE PICNICS.

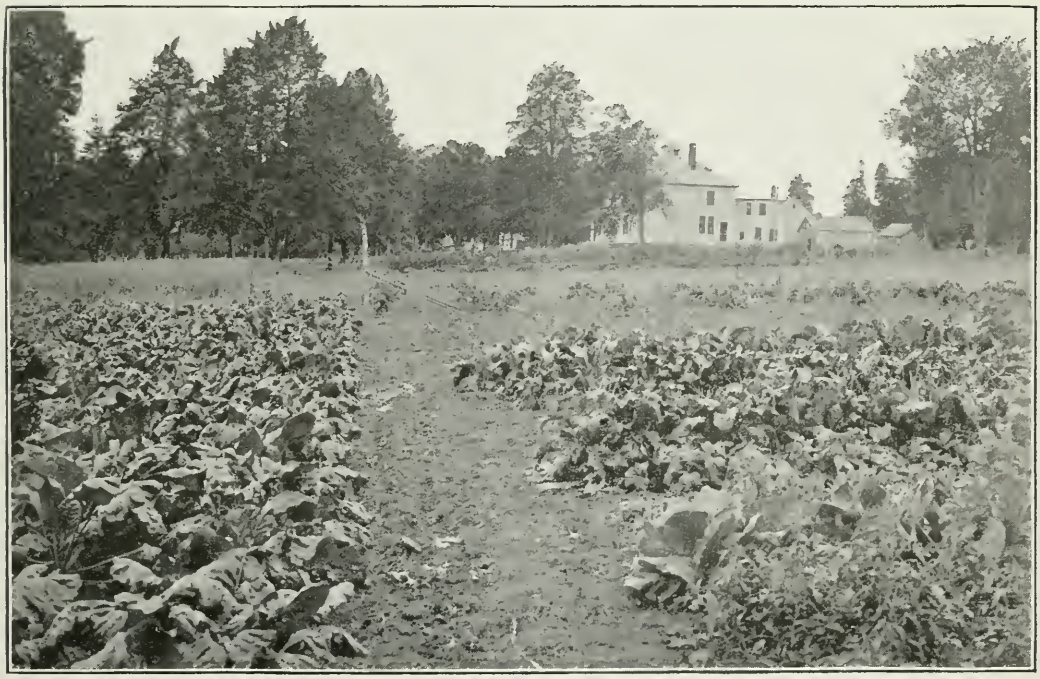
A number of addresses were given at Farmers' Institute Meetings. The attendance at these meetings showed a marked increase over last year. I spoke at a very large Annual Institute Picnic held at Augustine Cove on July 13, and at the York Institute Banquet, February 21, 1912.

EXHIBITIONS.

The Dominion Botanist assisted in making a very creditable display from the Experimental Station at the Provincial Exhibition held at Charlottetown, P.E.I., September 25-29, 1911.

I attended the Prince County Exhibition September 22-23, judged at the Egmont Bay and Mt. Carmel Institute Exhibition October 11 and the Tracadie Exhibition November 6, 1911.

The Barn, Experimental Station, Charlottetown, P.E.I.



The Superintendent's House and part of Vegetable Garden, Experimental Station, Charlottetown, P.E.I

SEED FAIRS.

Owing to illness I was obliged to cancel my engagements to judge at the four Seed Fairs held in the Province in March. I asked that Mr. LeLacheur be invited to take my place which he did. I was able to be at the Central Seed Fair held in Charlottetown, March 13 and 14, which closed a series of the best Seed Fairs yet held in the Province.

INVESTIGATION WORK THROUGHOUT THE PROVINCE.

I visited many of the farms within driving distance of the Station and consulted with the owners regarding problems that were of general interest; surveying for drainage in some instances; rogueing plots of special seed grain they had purchased from the Station, or taking up with them any problems they suggested.

On June 17-19, I accompanied the Dominion Horticulturist and Dr. Malte on an extended tour over the central portion of the Province, examining the native flora and investigating the almost total loss of the clover crop. We were unable to find a year old Red clover plant sound at the crown. Disease had weakened all examined. In most cases the tap root was dead and secondary roots had been put forth.

From September 19 to 24, I accompanied the Dominion Botanist investigating in the east the destruction of the balsam fir, and in the west, the cherry disease. We travelled from Charlottetown to Orwell, through a territory badly injured and found in every instance that the trouble of the balsam fir was due to a borer. Specimens were collected and sent to the Dominion Entomologist. From Orwell in the east to Alberton in the west we examined cherry orchards. With but few exceptions we found a fungus (cherry spot) attacking the cherry leaves, causing them to drop in June and July. We found many orchards killed out, others partly destroyed. By burning the dead leaves and rubbish in the autumn and by spraying thoroughly in the spring, with lime-sulphur, this disease can be controlled.

TRURO SHORT COURSE.

I gave assistance and instructions during the short course at the Truro Agricultural College from January 2 to 12, 1912.

CONVENTIONS.

I attended the Prince County Institute Convention July 11, 1911, the Central Farmers' Institute Convention November 28 and 29, and also the Provincial Fruit Growers' Association and the Provincial Dairymen's Association, which met in the City of Charlottetown.

When in Ottawa at the conference of Superintendents called by the Minister of Agriculture, I attended the Forestry Convention, the Seed Growers' Association, the National Live Stock Association, and the Dominion Fruit Growers' Conference.

DISTRIBUTION OF POTATOES AND SEED GRAIN.

Ninety-three samples of potatoes were sent out in April of 1911.

Seventeen lots of Marquis seed wheat were sold to farmers for seeding in 1911; in March, 1912, twenty four bushels of Marquis wheat was forwarded to the Cerealist at Ottawa for distribution.

CORRESPONDENCE.

During the year, 1,013 letters were received and 909 sent out, not including circulars.

VISITORS

The number of visitors to this Station increased in 1911 and arrangements are being made for still larger numbers in 1912.

METEOROLOGICAL RECORDS.

Months.	Temperature—Fahrenheit.					Rainfall.		Snowfall.		Total Precipitation.	Bright Sunshine.
	Maximum.		Minimum.		Monthly Mean.						
1911.	Date.	°	Date.	°	°	Days.	Ins.	Days.	Ins.	Ins.	Hrs.
April	28	74·7	3	9·0	35·90	6	0·71	1	2	·93	196·2
May	22	83	17	28	53·19	6	·32	.....	.....	·32	264·5
June	19	79	4	34·5	58·57	12	2·91	.....	.....	2·91	220·7
July	6	87	8	52·5	68·97	13	1·42	.....	.....	1·42	292·7
August	5	87	31	45	66·00	13	3·36	.....	.....	3·36	253·5
September	4–11	73	29	32	55·26	21	6·26	.....	.....	6·26	154·3
October	23	64	29	27	44·47	7	1·20	2	1·75	1·37	150·7
November	13	58·5	27	13	33·71	12	4·50	7	20·9	6·39	66·6
December	12	53·0	29	7	28·70	5	1·17	9	6·7	1·84	57·7
1912.											
January	9	43	27	-14·5	12·51	4	.47	19	29·8	3·45	128·3
February	22	42·5	11	-16	17·38	1	·58	16	50	5·58	118·1
March	16	48·5	6	- 9·2	25·88	7	1·31	12	23·22	3·63	149·6
Total Annual	.....	.....	.....	.. ...	....	107	24·01	66	134·35	37·46	2053·4

I have the honour to be, sir,
Your obedient servant,

J. A. CLARK,
Superintendent.

EXPERIMENTAL FARM FOR NOVA SCOTIA

REPORT OF R. ROBERTSON, SUPERINTENDENT.

NAPPAN, N.S., March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my report of the operations on the Experimental Farm for Nova Scotia, at Nappan, N.S., for the year ending March 31, 1912.

The spring of 1911 opened bright and cold, with some snow and frost throughout April, and much less then the usual rainfall through May, resulting in a decidedly light crop of hay and grass.

Seeding operations began on this Farm May 10, but owing to the continued dry weather, none of the crops made satisfactory progress until the latter part of June. From this out, weather conditions were quite favourable for crop-growing. Timely rains coming from July 15 until the end of August, with an unusual amount of high temperature, fairly good grain crops were the result.

Harvest was earlier than usual with weather conditions good during August.

September, as usual here, was a wet month with some frost, the first being on the 15th, when 5 degrees was registered.

October was a fine month and very suitable for the gathering of roots and fruit, both of which crops were satisfactory. Frost was experienced on fourteen different dates during this month, and snow on the 27th.

November was a month of dull weather, with frequent rains and snowfalls, making late harvesting of roots slow and disagreeable. Frost was recorded on all but seven days during the month, the lowest being 13 degrees on the 26th.

December was quite seasonable and somewhat colder than usual.

January was also unusually cold, and for the most part fair, as was also the month of February.

March was somewhat milder, with more broken weather.

ACKNOWLEDGMENTS.

I wish to acknowledge, with thanks, the valuable services of Mr. Thomas Coates, farm foreman, who has been responsible for the keeping of all records in connection with the uniform test plots, and of Robert Donaldson, herdsman, who has taken complete charge of the feeding and care of all classes of live stock.

TESTS OF VARIETIES.

EXPERIMENTS WITH SPRING WHEAT.

Eleven varieties of spring wheat were sown, in uniform test plots of one fortieth acre each, the land being a heavy clay loam on which roots had been grown the previous year, and manure applied for that crop. This was ploughed in the fall of 1910, well worked up in the spring, and sown May 10, at the rate of 1¾ bushels per acre; 10 lbs. clover and 12 lbs. timothy were also sown with this crop.

The following were the yields obtained:—

SPRING WHEAT—Test of Varieties.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
				Ins.		Ins.	Lbs.	Bush.	Lbs.	Lbs.
1	Pringle's Champlain	Aug. 12	94	44	10	3	2,520	42	..	63·0
2	Huron	" 12	94	43	10	3	2,440	40	40	64 0
3	White Fife	" 14	96	48	10	3½	2,440	40	40	61 5
4	Preston	" 12	94	44	8	3¼	2,400	40	.	63·5
5	Stanley	" 14	96	47	10	3¼	2,240	37	20	63·0
6	Red Fife	" 14	96	44	10	3	2,160	36	..	62·0
7	Red Fife (Ottawa Seed)	" 15	97	48	8	2¾	2,120	35	20	60·0
8	Marquis	" 14	96	43	10	3¼	2,080	34	40	64·0
9	Bishop	" 12	94	44	5	3	2,080	34	40	61·5
10	Bobs	" 14	96	47	6	3¼	2,040	34	..	62·0
11	Early Red Fife	" 15	97	46	6	3	2,000	33	20	60·0

FIELD CROPS OF WHEAT.

Five varieties of spring wheat were grown in half-acre lots.

The land was similar to, and received the same treatment as that which was devoted to the uniform test plots.

These field lots were sown on May 12.

The following yields were obtained;—

Huron, 34 bush., 40 lbs. per acre; White Fife, 28 bush., 14 lbs. per acre; Early Riga, 26 bush. per acre: Pringle's Champlain, 25 bush., 24 lbs. per acre; Red Fife, 22 bush., 32 lbs. per acre.

EXPERIMENTS WITH OATS.

Fifteen varieties of oats were sown in uniform test plots of one-fortieth acre each, the land being a heavy clay loam on which roots had been grown the previous year, and manure applied for that crop. This was ploughed in the fall of 1910, well worked up in the spring, sown May 11, at the rate of from two to two and one-half bushels per acre; 10 lbs. clover and 12 lbs. timothy were sown with this crop.

The following were the yields obtained:—

OATS—Test of Varieties.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
				In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Swedish Select	Aug. 12	93	47	5	7½	2,800	82	12	35
2	Lincoln	" 12	93	48	5	8	2,780	81	26	35·5
3	Improved Ligowo	" 10	91	43	5	7½	2,760	81	6	37·5
4	Improved American	" 18	99	50	8	8	2,720	80	00	35
5	Abundance	" 10	91	46	5	7½	2,680	78	28	33·5
6	Twentieth Century	" 12	93	45	5	7	2,640	77	22	35
7	Danish Island	" 9	90	43	6	7	2,520	74	4	34·5
8	Banner	" 10	91	44	8	7	2,500	73	18	34·5
9	Pioneer (black)	" 8	89	42	6	7½	2,480	72	32	38·5
10	Abundance (Garton's)	" 10	91	44	6	7	2,480	72	32	34
11	Irish Victor	" 10	91	42	8	7	2,440	71	26	36·5
12	Siberian	" 10	91	46	6	7	2,400	70	20	35
13	Thousand Dollar	" 10	91	45	7	8	2,240	65	30	36·5
14	Golden Beauty (yellow)	" 10	91	42	8	7	2,200	64	24	35
15	Gold Rain	" 10	91	46	6	7	2,000	58	28	37

EXPERIMENTS WITH BARLEY.

Seventeen varieties of barley, eight of six-row and nine of two-row, were sown, in uniform test plots of one fortieth acre each, the land being a heavy clay loam on which roots had been grown the previous year, and manure applied for that crop. This was ploughed in the fall of 1910, well worked up in the spring, sown May 11, at the rate of two bushels per acre; 10 lbs. clover and 12 lbs. timothy were also sown with this crop.

The following were the yields obtained:—

BARLEY (SIX-ROW)—Test of Varieties.

Number.	Name Variety.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of straw on a scale of 10 points.	Average Length of head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
				Ins.		Ins.	Lbs.	Bush.	Lbs.	Lbs.
1	Albert	Aug. 8	89	38	10	2¼	2440	50	40	52
2	Nugent	" 5	86	44	6	2¾	2400	50	00	50
3	Oderbruch	" 5	86	36	4	2¼	2360	49	8	48½
4	O.A.C. No. 21	" 8	89	46	6	2¾	2320	48	18	48½
5	Stella	" 10	91	40	7	2½	2240	46	32	51½
6	Manchurian	" 8	89	43	6	3	2040	42	42	46
7	Trooper	" 8	89	40	6	2½	1920	40	..	50
8	Odessa	" 5	86	37	4	2	1880	39	8	46.2

BARLEY (TWO-ROW)—Test of Varieties.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of straw on a scale of 10 points.	Average Length of head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
				Ins.		Ins.	Lbs.	Bush.	Lbs.	Lbs.
1	French Chevalier	Aug. 10	91	40	7	3½	2340	59	8	53
2	Swedish Chevalier	" 10	91	38	6	4	2720	56	32	53
3	Beaver	" 8	89	42	10	3¼	2680	55	40	52
4	Clifford	" 10	91	45	5	3	2360	49	8	52
5	Invincible	" 10	91	44	10	2½	2280	47	24	53
6	Jarvis	" 10	91	42	8	2½	2080	43	16	53½
7	Standwell	" 10	91	42	8	2½	1960	40	40	50½
8	Hannchen	" 10	91	38	8	3	1880	39	8	50
9	Canadian Thorpe	" 10	91	40	10	3	1720	35	40	51

EXPERIMENTS WITH PEAS.

Twelve varieties of peas were sown in uniform test plots of one fortieth acre each.

The land was a clay loam in rather a poor state of fertility, no manure having been applied for quite a number of years. This was ploughed in the fall of 1910, well worked up and sown May 12, at the rate of from one-half to two bushels per acre, according to the size of pea.

The following yields were obtained:—

PEAS—Test of Varieties.

Number.	Name of Variety.	Size of Pea.	Date of Ripening.	Number of Days Maturing.	Average Length of Straw.	Average Length of Pod.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
					Ins.	Ins.	Lbs.	Bush.	Lbs.	Lbs.
1	Golden Vine	Small	August 26	97	32	2	2,000	33	20	65·5
2	White Marrowfat	Large	" 28	99	36	3	1,860	31	..	65
3	Mackay	Medium	" 30	101	34	2½	1,820	30	20	65·5
4	Picton	" ..	" 30	101	36	2½	1,800	30	..	65·5
5	Chancellor	Small	" 26	97	30	1½	1,680	28	..	65
6	Black-eye Marrowfat	Large	" 28	99	36	3	1,600	26	40	64·2
7	Daniel O'Rourke	Small	" 26	97	36	2	1,560	26	..	65·2
8	Arthur (Selected)	Medium	" 26	97	34	2	1,520	25	20	65·5
9	Prince	" ..	" 30	101	35	2½	1,480	24	40	65
10	English Grey	" ..	" 28	99	32	2	1,440	24	..	64
11	Paragon	" ..	" 28	99	36	2½	1,200	20	..	65
12	Prussian Blue	" ..	" 26	97	33	2	1,000	16	40	65

FIELD CROPS OF OATS, BARLEY AND MIXED GRAIN.

Crops.	Yield per Acre.		Weight per Bushel.
	Bush.	Lbs.	Lbs.
6 acres, Oats, upland	50	14	34
6 " Oats, marsh	37	22	34
2 " Barley	35	36	48
9 " Mixed Grain	54	20	40

EXPERIMENTS WITH INDIAN CORN.

Eight varieties of Indian Corn for ensilage were sown in uniform test plots of one hundredth acre each.

The land was a clay loam which had been in pasture for some years. This was ploughed in the fall of 1910, cultivated and ploughed again in the spring after manure at the rate of 20 loads per acre had been applied. To this was added complete fertilizer at the rate of 300 lbs. per acre, and the corn sown in rows, 36 inches apart, and also in hills, 36 inches each way.

This was gone over with a smoothing harrow before the plants came through the ground. The plants were thinned out to from four to six inches apart in the rows, and from four to six plants left in each hill. This was cultivated four times during the season with a one-horse cultivator.

A severe frost on September 15 very materially lessened the weight and value of this crop.

The corn was sown June 8, and cut October 4.

The following yields were obtained:—

INDIAN CORN FOR ENSILAGE—Test of Varieties.

Number.	Name of Variety.	Average Height.	Condition when Cut.	Weight per Acre Grown in Rows.		Weight per Acre. Grown in Hills.	
		Ins.		Tons.	Lbs.	Tons.	Lbs.
1	Superior Fodder	92	Tasseling	16	1,480	13	1,000
2	Wood's Northern Dent	73	Early milk	15	600	14	1,160
3	Angel of Midnight	79	Soft glazed	15	240	14	1,880
4	Eureka	88	Silking	14	440	15	600
5	Longfellow	86	Soft glazed	13	1,720	12	1,200
6	Early Mastodon	86	Silking	13	280	15	1,500
7	Selected Leaming	90	"	11	104	11	320
8	Compton's Early	78	Soft glazed	10	520	8	1,280

FIELD CROPS OF INDIAN CORN.

Three acres of Indian corn were sown in lots of one acre each, the varieties used being Longfellow, Compton's Early and Angel of Midnight. A heavy frost on September 14, very materially affected this crop. The total yield was 33 tons.

EXPERIMENTS WITH FIELD ROOTS.

All the uniform test plots of roots were grown on a clay loam that had grown clover the previous year, and had a light crop of aftermath clover turned under in the fall of 1910. This was well worked up in the spring and manure at the rate of 20 tons per acre spread on the surface and ploughed under, and again thoroughly cultivated. Complete fertilizer was then applied at the rate of 300 lbs. per acre.

Turnips.

Ten varieties of turnips were sown in uniform test plots of one hundredth acre each, in drills 24 inches apart, and the plants thinned out to one foot apart in the rows.

Sown May 27, and harvested October 13.

Turnips—Test of Varieties.

Number.	Name of Variety.	Description of Variety.	Yield per Acre, 1st Sowing.		Yield per Acre, 1st Sowing.	
			Tons.	Lbs.	Bush.	Lbs.
1	Hall's Westbury	Round, purple	40	1,600	1,360	..
2	Magnum Bonum	Flat, round, purple	40	00	1,333	20
3	Jumbo	Long, dark purple	39	1,360	1,322	40
4	Hartley's Bronze	Medium long, bronze	38	400	1,273	20
5	Mammoth Clyde	Medium round, purple	38	00	1,266	40
6	Good Luck	Round, purple	37	400	1,240	..
7	Halewood's Bronze Top	Medium long, bronze	35	1,200	1,186	40
8	Perfection Swede	Round, purple	35	880	1,181	20
9	Carter's Elephant	Long, dark purple	34	1,600	1,160	..
10	Bangholm Selected	Oblong, purple	29	240	970	40

Mangels.

Eight varieties of mangels were sown in uniform test plots of one hundredth acre each, in drills 24 inches apart and the plants thinned out to one foot apart in the rows.

Sown May 27, and harvested October 2.

Mangels—Test of Varieties.

Number.	Name of Variety.	Yield per Acre 1st Sowing.		Yield per Acre 1st Sowing.	
		Tons.	Lbs.	Bush.	Lbs.
1	Selected Yellow Globe	43	.....	1,433	20
2	Giant Yellow Intermediate	42	240	1,404	..
3	Yellow Intermediate	39	1,600	1,326	40
4	Half Sugar White	39	.....	1,300	..
5	Gate Post	38	.....	1,266	40
6	Giant Yellow Globe	36	1,200	1,220	..
7	Perfection Mammoth Long Red	33	1,200	1,120	..
8	Prize Mammoth Long Red	33	160	1,102	40

SUGAR BEETS

Three varieties of sugar beets were grown in uniform test plots of one hundredth acre each, sown in drills 24 inches apart and the plants thinned out to one foot apart in the rows.

The seed was sown May 27, and the roots pulled October 12.

SUGAR BEETS—Test of Varieties.

Number.	Name of Variety.	Yield per Acre, 1st Sowing.		Yield per Acre 1st Sowing.	
		Tons.	Lbs.	Bush.	Lbs.
1	Klein Wanzleben	21	800	713	20
2	French Very Rich	20	....	666	40
3	Vilmorin's Improved	13	.....	433	20

CARROTS.

Five varieties of carrots were sown in uniform test plots of one hundredth acre each.

Sown May 27, and pulled October 12.

CARROTS—Test of Varieties.

Number.	Name of Variety.	Yield per Acre 1st Sowing.		Yield per Acre 1st Sowing.	
		Tons.	Lbs.	Bush.	Lbs.
1	Half Long Chantenay	21	400	706	40
2	Improved Short White	19	1,200	653	20
3	Mammoth White Intermediate	19	400	640	..
4	Ontario Champion	16	1,280	554	40
5	White Belgian	14	1,600	493	20

FIELD CROPS OF ROOTS.

Four varieties each of mangels and turnips were grown in half-acre plots. The land was similar to that on which was grown the uniform test plots and received like treatment, with the exception that on one-half of each plot no commercial fertilizer was used.

The following were the results obtained:—

Name of Variety.	Yield per Acre.		Yield per Acre.	
	Tons.	Lbs.	Bush.	Lbs.
MANGELS.				
¼ acre Yellow Globe, manure with fertilizer	27	750	912	30
¼ " " " " only	26	1,000	883	20
¼ " Mammoth Long Red, manure with fertilizer	27	600	910	..
¼ " " " " only	26	240	870	40
¼ " Yellow Intermediate, manure with fertilizer	26	500	875	..
¼ " " " " only	22	1,000	750	..
¼ " Golden Tankard, manure with fertilizer	20	800	680	..
¼ " " " " only	16	960	549	20
TURNIPS.				
¼ acre Magnum Bonum, manure with fertilizer	30	400	1,006	40
¼ " " " only	29	400	973	20
¼ " Best of All (Scotch), manure with fertilizer	30	100	1,001	40
¼ " " " " only	30	200	1,003	20
¼ " Hartley's Bronze, manure with fertilizer	29	1,600	993	20
¼ " " " only	27	1,200	970	..
¼ " Kangaroo, manure with fertilizer	26	1,900	898	20
¼ " " " only	22	1,300	755	..

FIELD CROPS OF TURNIPS.

Eight varieties of turnips were grown in plots of one acre each. The land was a clay loam in only a fair state of fertility, and was given a dressing of barnyard manure at the rate of 25 tons per acre. To one-half of each acre commercial fertilizer at the rate of 300 lbs. per acre was added.

The following were the results obtained:—

Name of Variety.	Yield per Acre.		Yield per Acre.	
	Tons	Lbs.	Bush.	Lbs.
½ acre Magnum Bonum, manure with fertilizer	28	1,660	961	.
½ " " " " only	27	1,320	922	..
½ " Hartley's Bronze, manure with fertilizer	27	620	910	20
½ " " " " only	27	360	906	..
½ " Best of all (Scotch), manure with fertilizer	25	1,890	864	50
½ " " " " only	25	1,260	854	30
½ " Jumbo, manure with fertilizer	25	1,820	863	40
½ " " " only	23	1,320	788	40
½ " Kangaroo, manure with fertilizer	25	550	842	30
½ " " " only	24	240	804	..
½ " Canadian Gem, manure with fertilizer	24	940	815	40
½ " " " " only	23	1,690	794	50
½ " Rennie's Prize Purple Top, manure with fertilizer	23	1,560	792	40
½ " " " " " only	23	980	783	..
½ " Sutton's Champion, manure with fertilizer	23	60	767	40
½ " " " " only	22	1,360	756	..

EXPERIMENTS WITH POTATOES.

Seventeen varieties of potatoes were sown in uniform test plots of one hundredth acre each, in rows 30 inches apart, one foot apart in the drill, the seed being cut to two strong eyes to the set.

The soil was a sandy loam on which clover hay had been grown the previous year. A light dressing of manure was applied to this land in the fall of 1910, and ploughed under. This was again ploughed in the spring, well harrowed, and complete fertilizer applied at the rate of 400 lbs. per acre.

The drills were harrowed down about the time the potatoes were coming up, to destroy weeds, and again rowed up.

The plants were sprayed four times throughout the season with Bordeaux mixture, Paris green being added on two occasions to destroy potato beetles.

There was no rot or disease of any kind. The sets were planted June 5 and dug September 27.

POTATOES—Test of Varieties.

No.	Name of Variety.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
1	Money Maker	470	48	382	48	88	..	Long, white.
2	Vick's Extra Early	462	..	352	..	110	..	" "
3	Ashleaf Kidney	446	36	402	36	44	..	Flat round "
4	Everett	431	12	343	12	88	..	" "
5	Carman No. 1	418	..	347	36	70	24	Round "
6	Rochester Rose	407	.	308	..	99	..	" red.
7	Dreer's Standard	400	24	341	..	59	24	" white.
8	Irish Cobbler	396	..	330	..	66	..	" "
9	Reeves' Rose	385	..	264	..	121	..	Long round, pink
10	American Wonder	367	24	268	24	99	..	" white
11	Morgan Seedling	364	12	281	36	82	36	Long round, pink and white.
12	Late Puritan	363	..	286	..	77	..	Lg. round, white
13	Empire State	356	24	308	..	48	24	" "
14	Gold Coin	332	12	279	24	52	48	Round "
15	Hard-to-Beat	323	24	264	..	59	24	" "
16	Dalmeny Beauty	300	..	249	24	50	36	" "
17	Factor	235	24	191	24	44	..	" "

ALFALFA.

Alfalfa was again sown this summer. The land was a clay loam, well underdrained. Lime at the rate of three casks per acre was spread on the surface and worked in, and the seed sown June 20. The alfalfa made healthy growth throughout the season.

Up to the present, no entirely satisfactory crop of alfalfa has been grown on this Farm, it being always partially killed out during the first winter, and, so far, we have never had a full stand the following season, although some small patches have survived each year, that sown in 1910 being no exception. This was cut twice during the summer of 1911, but was by no means a satisfactory crop.

SUMMARY OF CROPS GROWN, EXCLUSIVE OF UNIFORM TEST PLOTS OF GRAIN AND POTATOES.

	Bush.	Lbs.
Field grain	1,306	...
	Tons.	Lbs.
Field roots (turnips and mangels)	306	554
Fodder corn	33	...
Hay	103	...

APPLES.

The season of 1911 was quite favourable for apple growing, an average crop being gathered of unusually good quality.

In the orchard which was first set out at Nappan, from one to two trees only of each variety were planted as it was thought that this number was sufficient to determine whether a variety would succeed or not, but as it has since been proved which are the best for this section, it was decided, in 1910, to plant an orchard with fifteen trees each of the varieties shown to be most suitable, in order that these might be represented on a fairly commercial basis.

A piece of land about three acres in extent, fairly uniform, was selected for this purpose, the soil being a good clay loam, well drained.

The site is protected on the south and east by wood belts of native evergreens, and to afford protection on the west, from which many of the strong winds come, three rows of native spruce were set, in the spring of 1911, with the trees ten feet apart, the trees alternating in the different rows, to give greater protection.

The soil was thoroughly prepared in the autumn of 1910, and again in the spring of 1911, and on May 23 the trees were set out.

They were planted 20 x 28 feet apart and it is planned to cut out every other tree in the 20-foot rows, when they begin to crowd, so that instead of 20 x 28 feet apart, they will be 40 x 28 feet apart.

Notwithstanding the extremely warm summer, the trees grew remarkably well.

A close record was kept of the cost of planting and care of this orchard and the details of expenditures are given below. It is proposed to publish each year the cost of growing this orchard and eventually the revenue which is produced, the value of labour being calculated at the following rates: Manual labour, 17 cents per hour; teamsters, 20 cents per hour; horse labour, 7 cents per hour per horse.

The following is a list of the varieties:—

Duchess,
Wealthy,
Wolfe River,
Red Astrachan,
McIntosh Red,
American Golden Russet,
Bethel,
Talman,
Blue Pearmain,
Baxter or LaRue,
Pewaukee,
Arabka Winter,
Northern Spy,
Grimes' Golden,
Charlamoff.

COST OF COMMERCIAL ORCHARD, 1911.

Date.	Number of Hours Manual Labour.	Cost.	Number of Hours Horse Labour with Teamster.	Cost.	Work Engaged at.
		$ cts.		$ cts.	
May 20, 1911	To 195 trees at 6 cents....	31 20			
" 20, 1911	" 30 " 20 "	6 00			
" 15, 1911	" 2 men 2 days at $1.70...	6 80	....	.....	Measuring land.
" 17, 1911	" 4 " 1½ " 1.70...	10 20	....	.....	Digging holes.
" 23, 1911	" 4 " 1 day at 1.70...	6 80	....	.....	Planting trees.
" 24, 1911	" 4 " ½ " 1.70...	3 40	....	.....	" "
" 26, 1911	" 1 man 1 " 1.70...	1 70	....	.....	Pruning.
" 27, 1911	.....	.....	To 1 team 1 day at $3.40...	3 40	Cultivating.
June 4, 1911	....	.....	" 1 " 1 " 3.40...	3 40	Harrowing.
" 11, 1911	....	.....	" 1 " 1 " 3.40...	3 40	"
" 12, 1911	To 1 man 1 day at $1.70..	1 70	" 1 horse 1 " 2.70...	2 70	Spraying.
July 12, 1911	" 1 " 1 " 1.70...	1 70	" 1 " 1 " 2.70...	2 70	"
" 16, 1911	.. ..	... .	" 1 team 1 " 3.40...	3 40	Cultivating.
	.....	.....	" 1 " 1 " 3.40...	3 40	"
	.....	.....	" 1 " 1 " 3.40...	3 40	Harrowing.
		69 50		25 80	

GARDEN VEGETABLES.

PEAS.

The seed was sown May 18 in plots 32 feet long by 3 feet wide. The following results were obtained:—

GARDEN PEAS—Test of Varieties.

Variety.	Remarks.				Dates of Picking and Yields.				Total.
	Fit for Use.	Quality.	Length of Pod.	Size of Pod.	July 30.	Aug. 5.	Aug. 9.	Aug. 18.	
			Inch.		Lbs.	Lbs.	Lbs.	Lb	Lbs.
Sutton's Excelsior..	July 18..	Very good	3 to 4	Medium..	14½	7	2	.....	24½
Thomas Laxton....	" 16..	" .	4 to 5	Large.....	10	5½	4	.....	17½
Stratagem	" 30..	Medium..	4	"	9	9	4	4	33½
American Wonder..	" 15..	" ..	2 to 3	Medium..	9½	7	5	.....	21
Telephone.....	" 31..	Good.....	4	Large.....	14½	5	3	.....	22½
Premium Gem.....	" 15..	Medium..	2 to 3	"	12	7	4	....	23½
Gradus.....	" 25 .	" ..	2 to 2½	Small	6½	11	3	.....	20

BEANS.

The seed was sown May 18 in duplicate rows 32 feet long by 2¼ feet apart. One of these rows was allowed to ripen for seed, the other picked and a close record kept.

GARDEN BEANS—Test of Varieties.

Variety.	Remarks.				Dates of Picking and Yields.				Total.
	Fit for Use.	Quality.	Colour.	Length of Pod.	July 20.	July 26.	Aug. 2.	Aug. 8.	
				Ins.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs
Impd. Rust Proof.	July 17..	Good.....	Yellow. ..	5 to 6	4½	5½	9	3	22
Davis Wax.....	" 17.	Very good	" ...	7 to 8	8½	5	8½	.....	22
Fame of Vitry....	" 18..	Good.....	Green.....	8	2½	5½	15	4	27
Dwarf Matchless..	" 16..	"	"	6 to 7	9	6	9	5	29
Early Refugee ...	" 14..	"	"	5 to 6	14	12	3	.....	29
Valentine.....	" 14..	Very good	"	4½ to 5½	11½	11	4	.....	26½
Wardwells Kidney	" 16..	" .	Yellow. ..	5 to 6	3½	7	8½	6	24

TOMATOES.

The seed was sown in flats in the hot-beds April 8, in which they made a good growth. They were pricked out into strawberry boxes and remained in cold frames until June 12, when they were transplanted to the open. Eight plants of each variety were planted 5 feet apart each way. From these eight plants of each variety a record was kept.

TOMATOES—Test of Varieties.

—	Ripe Fruit and Dates of Picking.				Total.	Green Fruit and Date of Picking	Remarks.
	Sept. 9.	Sept. 17.	Sept. 22.	Sept. 30.		Sept. 30.	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
Trophy	8	22	30	.....	60	35....	Good.
Matchless	11	18	18	12	59	30....	"
Bonny Best.	4¾	6	14	18	42¾	51....	"
Rennie's XXX..	5	5	11	21	.....	20....	Blighted.
Florida Special .	.....	.....	... .	.....	.....	.....	Failure. No fruit.

CELERY.

Four varieties of Celery were grown in 1911.

Paris Golden Yellow, Rose Ribbed Paris, White Solid Pascal, Evan's Triumph.

The seed was sown in flats, and put in the hot-beds April 3 remaining there until May 26 when it was pricked out. They were planted in the open July 29, in rows 6 feet apart and the plants 1 foot apart in the rows. The plants were banked three times during the season.

The celery was dug October 23, and was found to be of a very good quality.

SMALL FRUITS.

In the spring of 1911, a small fruit plantation was set out, consisting of Black Currants, Red Currants, White Currants and Raspberries.

STRAWBERRIES.

The strawberry crop of 1911 gave promise of a very large yield, and did up until about the 15th of July, when a very dry spell set in, continuing for the remainder of their season. This caused them to dry up very rapidly, but still fairly good results were obtained. The size of the plot of each variety was 16½ ft. x 5 ft., or one five hundred and twenty-eighth of an acre.

The following are the yields of twenty of the most productive varieties last season.

STRAWBERRIES—Test of Varieties.

Variety.	Dates when Picked.					Yield per Plot.	Yield per Acre.
	July 3.	July 7.	July 8.	July 11.	July 17.		
	Qts.	Qts.	Qts.	Qts.	Qts.	Qts.	Qts.
1. Pearl	8	.....	7	4	1	20	10,560
2. Warfield	7	.....	7	3	3	20	10,560
3. Michael's Early	10	.....	5	3	.....	18	9,504
4. Carrie	7	.....	6	3	1	17	8,976
5. Beverly	2	3	3	4	3	15	7,920
6. Lovett	8	2	2	3	.....	15	7,920
7. Capt. Jack	3	.....	5	4	1	13	6,864
8. John Little	7	.....	3	3	.....	13	6,464
9. Splendid	3	.....	5	4	1	13	6,464
10. Haverland	5	.....	5	2	1	13	6,464
11. Pocomoke	7	.....	3	2	.....	12	6,336
12. Ida	3	3	2	2	2	12	6,336
13. Swindle	3	.....	3	4	2	12	6,336
14. Early Beauty	5	.....	2	2	2	11	5,808
15. Princess	6	.....	2	2	1	11	5,808
16. Saunders	3	.....	3	3	2	11	5,808
17. H. W. Beecher	.....	.....	.....	6	4	10	5,280
18. Big Bobs	.....	.....	4	3	3	10	5,280
19. Afton	.....	.....	4	3	3	10	5,280
20. Gandy	4	.....	1	2	.....	7	3,696

HORSES.

Nine horses are at present kept on this Farm. Six of them are draft horses, and three for lighter purposes, one of the latter being now 19 years old and only fit for slow and light work. Throughout the year, two draft horses have been bought, while two old and unsound ones have been exchanged for one young one, leaving the number one more than at this time last year. All are in good condition.

DAIRY COW EXPERIMENT.

With a view to demonstrating the value of grading up the common cows of the country by the use of a pure-bred bull of one of the established dairy breeds, it was thought wise to commence an experiment along this line. The intention is to

make a two or three year record with dam (termed foundation heifer), giving credit for all product, and charging for all food consumed at a fixed rate, based on present current prices, and used throughout the experiment. The dam to be followed by daughter (termed first cross), with conditions made as nearly alike as possible, she in turn to be followed by daughter (termed second cross).

With this experiment in view heifers 1½ years old were purchased in the fall of 1910, bred to an Ayrshire bull, and the test commenced January 1, 1912.

Twelve heifers are being used for this purpose, a careful record being kept of the amount of food consumed and the product given.

EXPERIMENTS WITH STEERS.

Forty-five head of steers are under feeding experiment at present. They were bought in November, dehorned, and put in to feed November 30. All were fed alike during the month of December with roots (turnips) at the rate of 80 lbs. per day per steer, 10 lbs. hay and no meal. The hay crop having been unusually light in this section, with roots in abundance, it was decided to carry on this experiment, commencing January, as follows:—

Lot I.—Tied—Roots 40 lbs. and good hay.

Lot II.—Tied—Roots 80 lbs. and poor hay.

Lot III.—Loose—Roots 80 lbs. and poor hay.

Roots to be reduced one-half March 1. All to get meal alike, which was: January, 2 lbs.; February, 3½ lbs.; March, 5 lbs.; per head per day.

Up to date, March 31, all have made satisfactory gains.

Lot 1, average gain per day, 1·77 lbs.; Lot II, average gain per day, 1·88; Lot III, average gain per day, 1·97 lbs. This experiment will be carried on until April 30, a satisfactory sale having been made for delivery at that date.

COMPLETION OF STEER-FEEDING EXPERIMENT, 1911, FINISHED SINCE LAST REPORT.

On making my report of March 31, 1911, 62 steers were on hand and under feeding experiment.

The statement was then made that the price paid in November being so much in advance of previous years, left a serious doubt as to whether the results would give a profit or a loss. The latter has turned out to be so in this case.

Experiments carried on here have demonstrated that an increase in selling, over buying price, of from 1 to 1¼ cts. per lb. is required to cover a four to six months' feeding period.

The following is the continuation and conclusion of above experiment.

Total live weight of 62 steers, Dec. 1, 1910	70,745
Total live weight of 62 steers, April 10, 1911	82,470
Increase to April 10, 1911	11,725

FINANCIAL RESULTS.

Original weight of 62 steers, 70,745 lbs. at 5·40 cts. per lb.	$3,820 23
Weight at finish of 62 steers, 82,470 lbs. at 5·85 cts. per lb.	4,824 49
Increase in value	1,004 26
Cost of feed for lot 130 days	1,128 40
Net loss	124 14

Daily rate of gain per steer	1·45 lbs.
Cost of 1 lb. gain	9·62 cts.
Cost of feed per day per steer	14 "
Loss per steer	$2 00

SHEEP.

The flock of sheep now numbers 26 head, consisting of 8 Shropshires, 6 Leicesters and 12 grades.

POULTRY.

Four breeds of poultry are kept: White Leghorns, Barred Plymouth Rocks, Buff Orpingtons and Black Minoreas, numbering in all 24 head.

BEES.

Fourteen colonies were put into winter quarters December 5, 1910. No colonies were lost although four were found to be rather weak and were united, making a total of twelve colonies which were put on summer stands on the evening of April 4. Experience has shown us that putting them out at night is preferable to morning. When taken out at night they will not leave the hive until the weather is right for flight whereas, when moved in the morning, they are apt to fly at once no matter what the weather is like and loss from chilling ensues.

Clover being badly winter-killed in this section, all honey gathered was dark and of a poor quality.

Eighteen colonies were put in the cellar in November. The hives were prepared for the winter in the usual way, being raised 2 inches from the bottom board and a covering of three empty bags put over each, the wooden cover having been removed.

At date of writing, March 31, all are doing well.

EXHIBITIONS.

An exhibit of farm products was made at the Nova Scotia Provincial Exhibition, Halifax, N.S., and at the New Brunswick Provincial Exhibition, at Fredericton, N.B.

AGRICULTURAL MEETINGS ATTENDED.

During the year, I attended and delivered addresses at the following meetings:—

Amherst, N.S.
Parrsboro', N.S.
Diligent River, N.S.
Middle River, N.S.
Antigonish, N.S.
Murray River, P.E.I.
Kingston, P.E.I.
Cornwall, P.E.I.
N. Milton, P.E.I.
N.S. Agricultural College Short Course, Truro, N.S.
Live Stock Convention, Ottawa, Ont.
Georgetown, P.E.I.
Summerside, P.E.I.

CORRESPONDENCE.

During the year 2,482 letters were received and 2,215 sent out, exclusive of reports and circulars sent out with samples of potatoes.

DISTRIBUTION OF POTATOES.

The annual distribution of potatoes for seed purposes was 260 samples.

METEOROLOGICAL RECORDS.

Months.	Temperature F.—Monthly.					Rain-fall.	Snow-fall.	Total Precipi-tation.	Sun-shine.
	Maximum.		Minimum.		Mean.				
1911.	Date.	°	Date.	°	°	Ins.	Ins.	Ins.	Hours.
April	30	73	3	12	36·63	·71	9	1·61	228½
May	22	85	17	26	52·96	·69	.....	·69	328
June	30	81	4	35	59·21	3·17	.....	3·17	254
July	6	89	8	45	68·48	2·30	.....	2·30	334
August	10	86	25	38	64·21	2·17	.....	2·17	298
September	3	75	15	27	53·71	4·74	.....	4·74	202
October	23	66	7	21	43·96	1·35	.....	1·35	202
November	13	60	26	13	34·33	2·84	10	3·84	112
December	11	54	31	4	17·52	1·17	4⅓	1·62	105
1912.									
January	9	45	27	-24	11·70	·55	14	1·95	148½
February	22	45	12	-18	18·22	·16	16	1·76	124
March	13	48	6	-15	27·54	1·26	11⅓	2·41	117

Sunshine not taken by recording instrument.
Ten inches of snow-fall is reckoned as equivalent to one inch of rain-fall.

I have the honour to be, sir,
Your obedient servant

R. ROBERTSON,
Superintendent.

EXPERIMENTAL STATION FOR CENTRAL QUEBEC.

REPORT OF G. A. LANGELIER, SUPERINTENDENT.

Cap Rouge, Que., March 31, 1912.

J. H. Grisdale, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith the second report of the operations on the Experimental Station for Central Quebec.

CHARACTER OF SEASON.

The weather, which had kept rough and stormy to the end of March, got milder soon after the beginning of April, and what was thought at first would be a very late spring, turned out to be an average one for earliness.

The first thing to be sown was sweet peas, on May 4, and grain was put in on the 15th. The latter part of this month was very hot, the temperature rising to 91° F. on the 22nd. As there was very little rain, the hay crop and pastures received a set-back from which they did not recover. The old meadows suffered the most, and as the precipitation of 4·12 inches in June helped out considerably the seedings of 1910, because the thick clover had shaded the ground and conserved more moisture during the drought of May, the comparison was a good object lesson to many farmers who take from six to ten crops of hay in succession from the same field.

June was a splendid month for growth of all plants, with its warm weather and heavy precipitation. Potatoes were put in on the 7th, corn on the 8th and 9th, and swedes on the 22nd and 23rd.

July was very hot, and haying was comparatively easy, with light winds to help evaporate the outside moisture. It was commenced on the 7th and finished on the 15th.

The weather continued quite warm in August, and corn seemed to be the only thing which was not suffering. The potatoes had been badly hurt and not more than half a crop was harvested in this district. The oats matured too early—some of them were cut on the 12th—and the yield was much lessened, on account of the grain being light.

September was a pleasant month, though a rainy one. Corn was cut from the 23rd to the 28th, and was above the average, both at the Experimental Station and on nearly all the farms where it was grown in the eastern part of Quebec.

October started well, and advantage was taken of the fine weather to pull potatoes on the 3rd. The cool nights of the previous month, though they did not help the potatoes, caused the swedes to recover from the temporary set-back which they had received during the hot spell of July and August, and these were an average crop. They were pulled from the 16th to the 24th.

The latest work done on the farm was ploughing the old garden, on November 3. The next day, the ground froze solid.

December was, on the average, milder than it is usually and it rained from the 10th to the 13th inclusive. Fortunately, there fell enough snow on the 16th, 17th and 18th, to cover the ground well before hard frosts came, as otherwise the grass lands would have been badly hurt.

January was very cold and windy, which practically stopped all work usually done by farmers during this month.

February was rougher yet. It blew nearly every day, and the snow piled up in banks of from 10 to 12 feet high at different places around the buildings on the Experimental Station.

With March came better weather, though it was cold. Roads were good and everybody who had logs, fuel, or anything else yet to haul, has been hard at work to finish before the spring thaw.

FIELD WORK.

The crops grown in 1911 were as follows:—

Crop.	Variety.	Acreage.	Total Yield.	Yield per Acre.
			Lbs.	Lbs.
Corn	Longfellow	4·88	122,925	12 tons. 1,911
Swedes	Magnum Bonum	3·00	88,920	14 " 1,640
Potatoes	Irish Cobbler	0·19	1,515	131 bush. 18
"	Green Mountain	0·58	4,140	119 " 36
"	Unknown	0·23	1,195	86 " 18
Barley	Mensury	3·72	3,605	20 " 9
Oats	Banner	34·36	42,808	36 " 22
"	Garton's Abundance	4·88	3,692	22 " 9
"	Waverley	4·86	3,113	18 " 29
"	Gold Rain	0·70	430	18 " 2
Hay	Clover	7·00	28,000	2 tons } Approximate.
"	Timothy and Clover	27·00	81,000	1½ " }
"	Old Meadow	24·00	48,000	1 " }

CULTURAL EXPERIMENT WITH INDIAN CORN.

Four plots of nearly equal size were sown within forty-eight hours of one another at different distances, and the result follows:—

In drills	42	inches apart,	8	inches between plants,	13·89	tons per acre.
"	48	"	8	"	13·82	"
In hills	42	"	42	"	11·92	"
"	36	"	36	"	11·33	"

The corn in hills had a better colour, but no comparison of the digestible nutrients in each was made this year.

ROTATIONS.

Four rotations were started in 1912, as follows:—

'D'—Three years—

First year: Corn, roots, potatoes, peas, and peas and oats to cut for soiling or for hay.

Second year: Oats, seeded down with 10 lbs. red clover, 6 lbs. timothy and 3 lbs. alsike per acre.

Third year: Hay, cut early and again cut late, if possible.

'C'—Four years—

First year: Corn, roots, potatoes, peas, and peas and oats to cut green for soiling or for hay.
Second year: Grain.
Third year: Hay.
Fourth year: Pasture.

'J'—Six years—

First year: Corn, roots, potatoes, peas, and peas and oats to cut green for soiling or for hay.
Second year: Grain.
Third year: Hay.
Fourth year: Pasture.
Fifth year: Grain.
Sixth year: Hay.

'I'—Six years—

First year: Corn, roots, potatoes, peas, and peas and oats to cut green for soiling or for hay.
Second year: Grain.
Third year: Hay.
Fourth year: Hay.
Fifth year: Pasture.
Sixth year: Pasture.

As some of the ground on which were these rotations was ploughed during the autumn of 1910, not all the plots which should have been in hay were so. These will be right in 1912, when it is also expected that a five-year and another six-year rotation will be started. All the plots are one acre in area, and as two alleys pass alongside them, they can be easily examined.

While a statement of cost of production and value of crop on each rotation would be of no value at present, being the result of only one year's work, it is hoped to publish such a record after more extended trial.

LIVE STOCK.

HORSES.

There are four teams of from 2,600 to 3,200 lbs. weight per team, and a driver of about 1,000 lbs. One team was bought this year.

EXPERIMENT—WINTERING A HORSE AT LOW COST.

An experiment was made with a twelve-year-old gelding who received from November 15 to March 31, a ration composed of one pound of swede turnips, one pound of oat straw and one pound of hay (mixed grasses from an old pasture) per day for each 100 lbs. of his weight. The horse worked until the end of October after which the oats were gradually replaced by swedes and straw, and the timothy by the hay above mentioned. By November 15 he was down to the new ration, and though the change was quicker than it perhaps should have been, the animal did not decrease in weight. Of course, he did no work. The box stall in which he stood was bedded with saw-dust, so that there would be no chance of the gelding eating his bedding, and everything left in the manger was weighed, but there was very little of this. The only exercise which the horse got was to drive the cream down to the railway station, a distance of 1½ miles for each trip, three times a week. Not to burden this

report with figures showing weekly weighings, it may be said that the horse, on March 31, at the close of the experiment, weighed 20 pounds more than he did at the commencement. From above date to May 1, the turnips and straw will gradually be replaced by oats, the mixed grasses hay by timothy, and light work will be given him, gradually increasing this and the ration, until on May 15 or thereabout, he should be able to take part in the spring's work without injury.

The temperature of the box stall next to where the horse stood was taken three times a day all winter, and it was remarkable how the weight of the animal decreased during weeks when there was a very cold spell.

According to tables made up in digestion experiments with horses (see Farmers' Bulletin No. 170, U.S. Dept. of Agriculture), ten pounds of the feeding stuffs in above ration, or enough for a 1,000-lb. horse, would contain 6·9 lbs. of digestible nutrients, 0·64 lb. of digestible protein, and the nutritive ratio would be 1·10. Grandeau and Leclerc, the well-known French investigators, were able to maintain the weight of three horses getting walking exercise for half an hour daily on a ration which supplied 7 lbs. of digestible nutrients, and an average of 0·54 lbs. of digestible protein, so that our ration was theoretically about correct. As far as the nutritive ratio is concerned, it does not seem to matter very much, as Grandeau fed the above mentioned three horses, sometimes on a ration of horse beans and straw having a nutritive ratio of 1·3, and again on one of Indian corn and straw having a ratio of 1·10. The effect of the rations was about the same in all cases, and any difference was in favour of the corn and straw ration having the wider ratio. As Henry says, it seems that the nutritive ratio for horses may vary widely without injury, as long as enough crude protein is given.

Cattle.—During the year, 1 bull, 10 cows and 4 heifers, registered French Canadians, and 11 cows appearing to be grades of the same breed were purchased. Up to the end of March, two of the grades, which had been served before we got them, calved, one a bull which was sold to the butcher, and the other a heifer which is true of colour and which is being raised.

One of the grade cows has given over 9,000 lbs. of milk from July to March inclusive, or an average of more than 1,000 lbs. per month. Both her dam and her daughter are in the Station herd.

It is planned to start with a rather low standard, say 5,000 lbs., and discard any cow, registered or not, who does not come up to it in 1912, not rejecting heifers after their first period of lactation, but keeping them two years. Any one giving less than 4,000 lbs. then, would have to be disposed of.

As the cows were bought at different times through the season, and some of them late in the fall their record is not given this year.

Swine.—There are now one boar, four breeding sows and two gilts, all registered Yorkshires, besides nine barrows and sows, fattening, and which will be ready for the butcher in early June when prices are generally high

During the year, one sow in pig was sold, one 200 lb. boar, and 20 pigs from 3 to 4 months old. Twice as many of the young ones could have been sold if available.

Sheep.—There are no sheep yet on the place; it is hoped to do some work with sheep in the near future.

Poultry.—There are two pens of White Wyandottes, one of 11 yearling hens and another of 14 pullets. Both are headed by good, strong males and it is planned to raise from 75 to 100 chickens yearly, the poultry-house not being large enough to accommodate more stock.

TESTS OF VARIETIES.

CEREALS.

All the test plots were of one-sixtieth acre each. May was unusually hot, as high as 91° F. being registered on the 22nd. The precipitation was only 1½ inches during this month, so that the ground was quite dry when the grain was sown. During June there was a rainfall of 4·12 inches and the weather was warm, so that seeds germinated very fast. This was a consolation to some farmers who were late putting in their crop, as in August the late-sown grain had caught up to that put in early. This consolation, however, was only momentary, as when threshing came, the late-sown grain, which matured too quickly, was very light, and the yield low.

These test plots were on a piece of light sandy loam, underlaid with shale, which has received an application of 20 tons of manure per acre in 1910 and which were in potatoes and corn that year. It had been disced twice with the double 'cut-away' in the fall of 1910, and was disced twice more with the same machine and harrowed with the spike tooth once before being sown in 1911.

SPRING WHEAT—1½ Bushels per Acre Seed.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per Measured Bushel after Cleaning.
					Lbs.	Bush. Lbs.	Lbs.
1	Huron	May 19	Aug. 14	87	2340	39·00	61.5
2	Prospect	"	" 14	87	2250	37.30	60.0
3	Bobs	"	" 14	87	2130	35.30	62.5
4	Preston	"	" 12	85	1845	30.45	60.5
5	Bishop	"	" 14	87	1830	30.30	62.5
6	Marquis	"	" 14	87	1725	28.45	63.2
7	Yellow Cross	"	" 14	87	1635	27.15	64.0
8	Red Fife	"	" 12	85	1290	21.30	62.0
9	White Fife		" 14	87	885	14.45	61.5
10	Early Red Fife	"	" 12	85	765	12.45	62.0

OATS—2½ to 3 Bushels per Acre Seed.

1	Daubeney	May 19	Aug. 3	76	2880	84.24	33.
2	Gold Rain	" 19	" 14	87	2850	83.28	37.2
3	Banner	" 19	" 14	87	2820	82.32	34.2
4	Swedish Ligowo	" 19	" 14	87	2805	82.17	35.0
5	Twentieth Century	" 19	" 14	87	2610	76.26	35.0
6	Clydesdale	" 19	" 14	87	2580	75.30	35.5
7	Siberian	" 19	" 14	87	2520	74.04	34.0
8	Victory	" 19	" 14	87	2460	72.12	36.5
9	Sixty Day	" 19	" 14	74	2430	71.16	32.0
10	Thousand Dollar	" 19	" 14	87	2130	62.22	35.0
11	Garton's Abundance	" 19	" 14	87	2115	62.07	34.5

SIX-ROW BARLEY—2 Bushels per Acre Seed.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per Measured Bushel after Cleaning.
					Lbs.	Bush. Lbs.	Lbs.
1	Escourgeon	May 19	Aug. 5	78	1740	36.12	50
2	Odessa	" 19	" 4	77	1410	29.18	48
3	Success	" 19	July 26	68	1305	27.09	44
4	Manchurian	" 19	Aug. 6	79	1290	26.42	48
5	Stella	" 19	" 3	76	1170	24.18	48.5
6	Black Japan	" 19	" 7	80	990	20.30	49.0
7	O.A.C. No. 21	" 19	" 7	80	669	13.36	47.5

TWO-ROW BARLEY—2 Bushels per Acre Seed.

1	Swedish Chevalier	May 19	Aug. 12	85	1980	41.12	51.5
2	Early Chevalier	" 19	" 1	74	1920	40.00	50.0
3	Hannchen	" 19	" 12	85	1680	35.00	51.0
4	Beaver	" 19	" 14	87	1620	33 36	50.2
5	Swan's Neck	" 19	" 12	85	1590	33.06	50.5
6	Duckbill	" 19	" 9	82	1425	29.33	49.5

PEAS—2½ to 3 Bushels per Acre Seed.

1	Arthur Selected	May 18	Aug. 13	87	2280	38.00	65
2	English Grey	" 18	" 13	87	2010	33.30	64.5
3	Wisconsin Blue	" 18	" 13	87	1950	32.30	65.5
4	Golden Vine	" 18	" 13	87	1935	32.15	66.0
5	Mackay	" 18	" 8	82	1755	29.15	65.0
6	White Marrowfat	" 18	" 13	87	1740	29.00	65.2
7	Black-eye Marrowfat	" 18	" 8	82	1665	27.45	65.0
8	Chancellor	" 18	" 8	82	1560	26.00	66.0
9	Prussian Blue	" 18	" 13	87	1245	20.45	68.0
10	Paragon	" 18	" 8	82	1020	17.00	65.5

MIXED GRAINS—2½ Bushels per Acre Seed.

1	Swan's Neck Barley & Gold Rain Oats	May 19	Aug. 12	85	2280	
2	Swedish Chevalier Barley & Thousand Dollar Oats	" 19	" 14	87	1665	
3	Duckbill Barley & Banner Oats	" 19	" 14	87	1605	
4	Manchurian Barley & Daubeney Oats	" 19	Aug. 1	74	1185	

If we calculate the digestible protein found in the total of each of these crops, it is as follows, per acre: Peas, 338·05 lbs.; oats, 274·34 lbs.; mixed oats and barley, 161·66 lbs.; wheat, 146·96 lbs.; two-row barley, 142·96 lbs.; six-row barley, 102·73 lbs. Choosing the best variety of each, the difference is still greater, as follows: Arthur selected peas, 549·16 lbs.; Daubeney oats, 308·16 lbs.; Swan's Neck barley and Gold Rain oats, 218·28 lbs.; Huron wheat, 205·92 lbs.; Swedish Chevalier barley (two-row), 166·32 lbs.; Escourgeon barley (six-row), 146·16 lbs.

According to the above figures, the pea crop would be a very important one as a source of cheap protein. The popular impression is contrary to this, and it will be interesting to see the figures of 1912.

ROOTS.

All the test plots were of one-fiftieth of an acre. As these were sown at the end of May, they escaped the hot spell of that month, and started very well during June, which had abundance of rain. No doubt, the very warm weather of July and August affected them a little, but the cool nights of September brought relief and accelerated the growth.

These plots were on a wet, sour piece of ground, but it was the only piece available. The low yield of the mangels and sugar beets was due mainly to this. It is expected to have them all on good average land in 1912, when the results will be more satisfactory.

TURNIPS (Swedes)—Drills 30 inches apart, plants 8 inches apart.

Number.	Name of Variety.	Date of Sowing.	Date of Pulling.	Yield per Acre.		Yield per Acre.	
				Tons.	Lbs.	Bush.	Lbs.
1	Good Luck	May 30...	Oct. 13.....	26	1,122	885	22
2	Carter's Elephant	" 30....	" 13.....	25	115	835	15
3	Magnum Bonum	" 30....	" 13.....	24	1,344	822	24
4	Jumbo	" 30....	" 13.....	23	105	768	25
5	Halewood's Bronze Top	" 30....	" 13.....	22	1,874	764	34
6	Mammoth Clyde	" 30....	" 13.....	22	949	749	9
7	Hartley's Bronze	" 30....	" 13....	22	718	745	18
8	Bangholm Selected	" 30....	" 13.....	21	1,639	727	19
9	Perfection	" 30....	" 13.....	20	1,865	697	45
10	Hall's Westbury	" 30....	" 13.....	19	1,321	655	21

MANGELS—Drills 30 inches apart, plants 8 inches apart.

1	Giant Yellow Intermediate	May 30	Oct. 11.....	9	1,429	323	49
2	Gate Post	" 30	" 11.....	7	263	237	43
3	Half Sugar White	" 30	" 11.....	6	1,878	231	18
4	Perfection Mammoth Long Red	" 30	" 11.....	6	721	212	1
5	Prize Mammoth Long Red	" 30	" 11.....	4	1,021	150	21
6	Giant Yellow Globe	" 30	" 11.....	4	18	133	38
7	Yellow Intermediate	" 30	" 11.....	3	1,941	132	21
8	Selected Yellow Globe	" 30	" 11.....	3	553	109	13

CARROTS—Drills 30 inches apart, plants 4 inches apart.

1	Improved Short White	May 30....	Oct. 12.....	10	1,202	353	22
2	White Belgian	" 30....	" 12.....	9	1,429	323	49
3	Mammoth White Intermediate	" 30....	" 12.....	9	118	301	58
4	Half Long Chantenay	" 30....	" 12.....	7	1,497	258	17
5	Ontario Champion	" 30....	" 12.....	7	1,034	255	4

SUGAR BEETS—Drills 30 inches apart, plants 8 inches apart.

1	Klein Wanzleben	May 30...	Oct. 11.....	4	365	139	25
2	Vilmorin's Improved	" 30....	" 11.....	3	1,594	126	34
3	French Very Rich	" 30...	" 11.....	3	515	108	35

POTATOES.

The yield of each variety was calculated from one row 66 feet long. They were sown on June 3, and escaped the drought of May. The warm weather of July and August, though, hurt them all badly and decreased the crop.

The ground where they were planted was ploughed in August, 1910, and cultivated about half a dozen times the same autumn. Thirty tons of manure per acre was applied in thte spring of 1911, the land ploughed, disced, harrowed, rolled and harrowed, then the drills were made 30 inches apart, the sets being dropped about every 12 inches and covered with the double mouldboard plough. The seed was not treated against disease. They were ready for use from the 6th to the 26th of August.

Number.	Name of Variety.	Seed from	Yield.					
			Marketable.		Unmarketable.		Total.	
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
1	Late Puritan	Charlottetown	203	13	13	12	216	25
2	Money Maker	Nappan	169	24	13	12	182	36
3	American Wonder	Charlottetown	158	24	8	48	167	12
4	Empire State	"	150	09	8	48	158	57
5	Ashleaf Kidney	"	151	48	6	36	158	24
6	Carman No. I	Nappan	143	..	6	36	149	36
7	Gold Coin	"	135	02	14	34	149	36
8	Irish Cobbler	"	136	..	8	48	144	48
9	Morgan Seedling	Charlottetown	123	28	15	24	138	52
10	Vick's Extra Early	"	114	24	17	36	132	..
11	Dreer's Standard	"	118	48	4	24	123	12
12	Rochester Rose	Nappan	108	21	14	18	122	39
13	Dalmeny Beauty	Charlottetown	68	12	8	48	77	..
14	Carman No. I	Ottawa	24	12	2	12	26	24
15	Hard to Beat	"	13	12	8	48	22	..
16	Irish Cobbler	"	13	12	6	36	19	48
17	Ashleaf Kidney	"	8	48	6	36	15	24
18	Empire State	"	2	18	13	06	15	24
19	Factor	"	8	06	6	36	14	42
20	Rochester Rose	"	..	..	11	..	11	..
21	Reeves' Rose	Indian Head	..	..	6	36	6	36
22	Gold Coin	Ottawa	..	..	5	30	5	30
23	Morgan Seedling	"	..	..	5	30	5	30
24	Reeves Rose	"	..	..	5	30	5	30
25	Money Maker	"	..	..	5	..	5	..
26	Dalmeny Beauty	"	2	24	2	24	4	48
27	Late Puritan	"	..	..	4	..	4	..

HORTICULTURE.

TREE FRUITS.

The following were planted during the latter part of May, 1911:—

Apples—Commercial orchard.—192 trees of the following varieties: Alexander, Duchess, Fameuse, Langford Beauty, Lowland Raspberry, Milwaukee, Montreal Peach, McIntosh Red, McMahan, Red Astrachan, St. Lawrence, Wealthy, Wolf River, Yellow Transparent.

Apples.—Variety tests—111 trees of the following varieties: Adonis, Beauty, Blue Pearmain, Brackett, Bruno, Burt, Calville Bode, Claire, Clive, Charlamoff, Cora, Cromer Crusoe, Dyer (Pomme Royale), Edgehill, Estaline. Forest, Garner, Gem City,

Granby, Hoadly, Hyslop (crab), Dudley, Kelso, Kinkhead, La Victoire, Medford, Mendel, Noel, Okabena, Patten's Duchess, Pensaukee Russet, Percival, Perfect, Petrel, Radnor, Reinette de Damson, Reinette, Dippedelle, Renaud, Rochelle, Royal Table, Rupert, Scarlet Pippin, Severn, Shiawassee, Sonora, Stone, St. Lawrence, Thurso, Transcendent, Walton, Walter, Whitney (crab).

Plums.—Variety tests—89 trees: Damas, Reine Claude Montmorency, Admiral Schley, Aitkin, Bixby, Bonne Sainte Anne, Brackett, Coe's Golden Drop, Consul, Cottrell, Cheney, Don, Fitzroy, Gloria, Grand Duke, Gueü, Hawkeye, Imperial Gage, Lombard, Lester, Mankato, Moore's Arctic, Niagara, Odegard, Omaha, Oren, Oyama, Pond's Seedling, Quackenboss, Raynes, Reine Claude, Shipper's Pride, Shropshire Damson, Snider Damson, Sunrise, Swift, Terry, Washington, Wolfe, Yellow Egg, Yellow European.

Cherries.—Variety tests—36 trees: Large Montmorency, Cherry France, Brusseler Braun, Cerise d'Ostheim, Fouche Morello, Griotte d'Ostheim, Griotte Morello, Hersformige Weichsel, Koslov, Minnesota, Ostheim, Montmorency Ordinaire, Morello, Orel, Susse Fruche Weichsel, Vladimir.

Pears.—Variety tests—13 trees: Winter Nelis, Duchesse d'Angoulême, Seckel, Clapp's Favourite, Flemish Beauty.

Dwarf Cherries (Prunus Tomentosa).—200.

SMALL FRUITS.

The following were set out at the same time as the above mentioned fruit trees:—

Black Currants.—Six bushes each of Champion, Eagle, Ontario, Boskoop Giant, Kerry, Victoria, Buddenborg, Success, Collins' Prolific, Lee's Prolific, Saunders, Topsy, Clipper, Eclipse, Climax.

Red Currants.—Six bushes each of Cherry, Cumberland, Fay's Prolific, Franco-German, Greenfield, Perfection, Pomona, Rankins' Red, Red Dutch, Red Grape, Victoria Red, Wilder.

White Currants.—Six bushes each of Large White, White Cherry, White Grape.

Gooseberries.—Six bushes each of Downing, Gibb, Industry, Josselyn, Mabel, Queen Anne, Red Jacket, Rideau, Saunders, Silvia.

Raspberries.—Twelve canes each of Columbian, Cuthbert, Heebner, Sarah, and 24 each of Eaton, Herbert, King, Loudon, Marlboro.

Strawberries.—134 plants of the following varieties: Bisel, Greenville, Nettie, New Globe, Uncle Jim.

Most of the above were planted when the thermometer registered nearly 90° F., and during one of the driest spells ever experienced here, but a rather small proportion of the trees, bushes, canes and plants died.

CULTURAL EXPERIMENTS IN ORCHARD.

The ground used for the orchard was infested with couch grass, and it was decided to use, for a cover crop, rape on one-third of the area, buckwheat on one-third, and rape with buckwheat on the rest. This piece had been ploughed in August, 1910, and cultivated five or six times before the end of October. In May, 1911, twenty tons of manure per acre was applied, the land ploughed, disced, harrowed, and the trees planted. Afterwards, it was cultivated four times, harrowed, and sown to the cover crops about the beginning of

July. The growth was very good. From this experiment, it seems that for couch-infested ground, rape is the best. The trouble with buckwheat is that it ripens, shells, and the plant dries out, leaving lots of space for light to go through. In a fine, warm, open fall, the couch has thus a good chance to start anew. With rape, the ground is kept shaded and the couch choked down until killing frosts come.

VEGETABLES.

One hundred and ninety-two varieties were tested during 1911. Some were started in flats in the greenhouse, pricked out in other flats in the same place, then transplanted into hot-beds and finally set out in the garden.

The ground used for vegetables had been ploughed in August, 1910, and cultivated five or six times the same autumn. Thirty tons of manure per acre was applied in May, 1911, the land ploughed, disced, harrowed, rolled and harrowed again before the vegetables were put in. Frequent cultivations during the summer kept the weeds down and conserved moisture.

In the following tables will be found the results obtained from tests of some of the more important vegetables.

The figures under the headings 'Earliness' and 'Yield' respectively, represent the relative standing of each variety reported on, in the above particulars. Thus, under 'Earliness,' varieties marked 1 are the earliest, those marked 2 are the next earliest, and so on. Under 'Yield,' varieties marked 1 are the heaviest yielders, those marked 2 are the next heaviest, etc.

BEANS.

Name.	Sown.	Transplanted.	Ready for Use.	Relative Earliness & Yield.	
				Earliness.	Yield.
Challenge Black Wax	June 3		July 20	1	7
Davis Wax	" 3		" 25	4	11
Early Giant Bush Lima	" 3		Aug. 10	7	12
Early Refugee	" 3		July 27	5	5
Flageolet, or Giant Wax	" 3		" 27	5	4
Hodson Wax	" 3		Aug. 10	7	1
Old Homestead	" 3		" 7	6	2
Red Valentine	" 3		July 25	4	9
Refugee, or 1000 to 1—(Henderson)	" 3		Aug. 10	7	10
Refugee, or 1000 to 1—(Ont. Seed Co.)	" 3		" 10	7	3
Stringless Green Pod	" 3		July 22	2	8
Valentine	" 3		" 25	4	6
Wardell's Kidney Wax (Ont. Seed Co.)	" 3		" 22	2	8
Wardell's Kidney Wax (Thorburn)	" 3		" 24	3	5

CABBAGE.

Copenhagen Market	April 5	May 31	Sept. 8	5	16
Danish Ballhead	" 5	" 31	" 16	6	7
Danish Summer Ballhead	" 5	" 31	Aug. 23	2	2
Early Copenhagen Market	" 5	" 31	Sept. 8	5	8
Early Jersey Wakefield	" 5	" 31	Aug. 12	1	9
Early Red Delicatesse	" 5	" 31	Sept. 16	6	12
Extra Amager Danish Ballhead	" 5	" 31	" 16	6	4
Extra Dark Red Dutch	" 5	" 31	" 8	5	11
Extra Early Midsummer Savoy	" 5	" 31	" 8	5	14
Flat Swedish	" 5	" 31	Aug. 30	4	1
Improved Amager Danish Roundhead	" 5	" 31	" 30	4	6

CABBAGE—*Continued.*

Name.	Sown.	Transplanted.	Ready for Use.	Relative Earliness & Yield.	
				Earliness.	Yield.
Large Late Flat Drumhead	April 5	May 31	Sept. 8	5	3
Lubeck	" 5	" 31	" 8	5	18
Magdeburg	" 5	" 31	" 16	6	10
Red Danish Delicatesse	" 5	" 31	" 22	7	15
Red Danish Stonehead	" 5	" 31	" 16	6	13
Small Erfurt	" 5	" 31	Aug. 26	3	17
Winningstadt	" 5	" 31	" 26	3	5
CORN.					
Black Mexican	June 3		Sept. 8	5	1
Country Gentleman	" 3		" 27	6	10
Dewitt's Early	" 3		Aug. 15	1	9
Early Evergreen	" 3		" 30	4	8
Early Malakoff	" 3		" 15	1	2
Fordhook Early	" 3		" 15	1	4
Golden Bantam	" 3		" 29	3	6
Golden Rod	" 3		" 29	3	1
Metropolitan	" 3		" 26	2	5
Pocahontas	" 3		" 26	2	3
Stowell's Evergreen (Graham)	" 3		Sept. 8	5	7
" " (Ont. Seed Co.)	" 3		" 8	5	6
LETTUCE.					
All Heart	May 26		July 1	4	
Big Boston	" 26		" 8	6	
Black Seeded Simpson	" 26		June 27	1	
Cos Trianon	" 26		July 1	4	
Crisp as Ice	" 26		June 30	3	
Giant Crystal Head	" 26		" 28	2	
Grand Rapids (Ont. Seed Co.)	" 26		July 1	4	
Grand Rapids (Thorburn)	" 26		June 28	2	
Hanson	" 26		July 5	5	
Iceberg	" 26		" 1	4	
Improved Hanson	" 26		June 27	1	
May King	" 26		July 1	4	
Mignonette	" 26		" 8	6	
Nonpareil	" 26		June 28	2	
Red Edged Victoria	" 26		July 1	4	
Wheeler's Tom Thumb	" 26		" 1	4	
MUSKMELON.					
Earliest Ripe	April 6	June 7	Sept. 18	5	11
Early Hackensack	" 6	" 7	" 12	3	1
Emerald Gem	" 6	" 7	" 20	6	12
Extra Early Green Citron	" 6	" 7	" 5	1	4
Hackensack	" 6	" 7	" 23	7	8
Hoodoo (Johnson)	" 6	" 7	" 18	5	9
Hoodoo (Steele-Briggs)	" 6	" 7	" 13	4	7
Melting Sugar	" 6	" 7	" 20	6	3
Montreal Green Nutmeg	" 6	" 7	" 12	3	6
Montreal Market	" 6	" 7	" 23	7	5
Paul Rose	" 6	" 7	" 20	6	10
Rocky Ford	" 6	" 7	" 10	2	2

ONIONS.

Name.	Sown.	Transplanted.	Ready for Use.	Relative Earliness and Yield.	
				Earliness.	Yield
Johnson's Dark Red Beauty	May 27		Aug. 7	3	6
Large Red Wethersfield (Ont. Seed Co.)	" 27		" 2	1	2
Large Red Wethersfield (Vilmorin)	" 27		" 2	1	4
Prizetaker	" 27		" 7	3	4
Salzer's Wethersfield	" 27		" 2	1	6
Small Silverskin	" 27		" 7	3	6
Southport Red Globe	" 27		" 5	2	5
Yellow Globe Danvers (Ont. Seed Co.)	" 27		" 7	3	3
Yellow Globe Danvers (Vilmorin)	" 27		" 7	3	1

PEAS.

American Wonder	June 2		July 17	3	6
Gradus	" 2		" 17	3	8
Gregory's Surprise	" 2		" 15	1	7
Heroine	" 2		" 29	8	4
Juno	" 2		Aug. 2	9	3
McLean's Advancer	" 2		July 27	6	1
Premium Gem	" 2		" 16	2	7
Stratagem	" 2		Aug. 2	9	2
Sutton's Excelsior	" 2		July 20	5	9
Telephone	" 2		" 28	7	5
Thos. Laxton	" 2		" 19	4	7

PEPPERS.

Chinese Giant	April 3	June 6	Remained green	3	3
Long Red Cayenne	" 3	" 6	Sept. 22	1	2
New Neapolitan	" 3	" 6	" 28	2	1
Red Chili	" 3	" 6	" 28	2	2

SQUASH.

Custard Marrow White Bush Scallop	June 5		Aug. 22	1	4
Delicata	" 5		Sept. 14	3	7
Heart O'Gold	" 5		" 8	2	1
Hubbard	" 5		" 14	3	6
Long Vegetable Marrow	" 5		Aug. 22	1	2
Long White Bush Marrow	" 5		" 22	1	5
Mammoth Whale	" 5		Sept. 14	3	3
Summer Crookneck	" 5		Aug. 22	1	8
White Congo	" 5		Did not ripen	4	9

TOMATOES.

Bonny Best	April 4	June 6	Aug. 19	7	10
Chalk's Early Jewel (Burpee)	" 4	" 6	" 19	7	14
Chalk's Early Jewel (Ont. Seed Co.)	" 4	" 6	" 15	6	9
Earliana	" 4	" 6	" 9	2	3
Earliest of All	" 4	" 6	" 10	3	4
First of All	" 4	" 6	" 10	3	1
Florida Special	" 4	" 6	" 25	8	13
Greater Baltimore	" 4	" 6	" 30	9	11
Livingston's Globe	" 4	" 6	" 30	9	17
Matchless	" 4	" 6	Sept. 12	11	16

TOMATOES—*Continued.*

Name.	Sown.	Transplanted.	Ready for Use.	Relative Earliness and Yield.	
				Earliness.	Yield.
Northern Adirondack Earliana	May 4	June 6	Aug. 7	1	6
Plentiful	" 4	" 6	Sept. 5	10	12
Ponderosa	" 4	" 6	" 12	11	15
Rennie's XXX Earliest	" 4	" 6	Aug. 14	5	2
Sparks Earliana (Burpee)	" 4	" 6	" 12	4	5
Sparks Earliana (C.E.F.)	" 4	" 6	" 9	2	7
Trophy	" 4	" 6	Did not ripen	12	18
Yellow Plum	" 4	" 6	Aug. 9	2	8

WATERMELON.

Cole's Early	April 6	June 5	Sept. 13	2	3
Florida Favorite	" 6	" 5	" 22	4	2
Improved Ice Cream	" 6	" 5	" 22	4	4
Phinney's Early	" 6	" 5	" 20	3	5
Salzer's Earliest	" 6	" 5	" 11	1	1

Beets sown May 30 were ready for use on July 25; Brussels Sprouts sown April 6 and transplanted May 31, were ready for use October 21; carrots sown May 30 were ready for use July 29; cauliflower sown April 6, and transplanted May 31, were fit for the table August 19; celery sown April 1, and transplanted June 8, was ready for use September 9; parsley, sown May 26, was ready for use July 22; parsnips, sown May 30, were ready on August 25; radish, sown May 26, were fit for table on June 24; and early turnips, sown May 27, were ready for use on July 15.

FLOWERS.

One hundred and fourteen varieties were sown, both in flats and pots in the greenhouse, to be later transplanted in the garden, and directly outside when all danger from frost was passed.

The flowers were put in an old garden which was well dug and manured, and made a splendid show from the middle of August to October.

A few shrubs and vines, also a short piece of hedge were put in around the Superintendent's house, where it is high and dry, but with the warm weather of July and August, did practically nothing.

Over 3,000 bulbs were planted last fall in the same locality.

STATION IMPROVEMENTS.

Over 10,000 feet of tiles were put in during 1911.

An old bridge was torn down, a 24-inch metal pipe put in, and the whole filled up level with the road. Rock from an adjoining clump was used for this.

The foreman's house received two, and at some places, three coats of paint. A water closet was put in and pipes from there and the kitchen were led into a septic tank which was placed some 150 feet from the house.

A new ornamental wire fence was stretched in front of this house and the grounds were levelled and sown to Kentucky Blue grass. A neat shed was also built behind it.

An unsightly mound of shale which stood between two rotation plots was blasted and hauled down near the ornamental grounds, to be used for alleys in 1912. The spot will be covered with soil and manure, so that the rotations will be even all through.

About twenty acres of second-growth woods were chopped, and the wood hauled down near the buildings to be cut for fuel early in April. All this farm, the old Garneau place, next to the Transcontinental railway, is thus ready to be stumped, and put under crops. This is much better land than that now in cultivation.

VISITORS.

There were quite a number of persons visiting the farm during the year, some of the farmer's clubs sending out delegations, one of which, from Pointe-aux-Trembles, County of Portneuf, was composed of about 30 members. The rotation and trial plots, also vegetable tests, were the chief attractions.

MEETINGS.

I addressed three meetings, one at L'Ange Gardien, County of Montmorency, and the others at St. Raymond and St. Léonard, County of Portneuf. The main subject was Indian corn culture. Over 100 farmers grew corn as the result of this. It seems very hard, however, to make the majority of them understand that corn should not be sown thickly and though I made two visits at most of the places of the farmers who grew corn, only a few heeded the advice of giving room to the plant for the growth of ears.

CORRESPONDENCE.

During the year, 1,604 letters were received and 1,974 were sent, not including circulars.

DISTRIBUTION OF SEEDS.

Up to March 31, 1912, 55 small packages of sweet corn were sent out, and there are over 900 ready to go.

Pure-bred French Canadian Mares at the Ca › Rouge Station.

Some pure-bred French Canadian Cattle at the Cap Rouge Station.

METEOROLOGICAL DATA.

Month.	Temperature. F.					Rainfall.		Snowfall.			Sunshine.
	Date.	Highest.	Lowest.	Date.	Mean.	Inches.	No. days.	Inches.	No. days.	Total.	Total.
1911.											
April											
May	22	91·0	30·2	13	59·82	1·50	6			1·50	
June	29	83·0	39·2	3	61·14	4·12	13			4·12	
July	4	93·0	46·2	3	57·05	3·46	15			3·46	
August	4	88·0	42·2	30	65·86	2·76	11			2·76	
September	6	72·0	30·2	29	52·50	4·67	13			4·67	37·4
October	11	65·0	23·2	28	43·23	2·76	10			2·76	120·8
November	13	52·0	7·2	26	26·70	2·17	7	26·2	12	4·79	56·9
December	12	45·0	11·2	31	21·30	1·43	5	25·7	11	4·00	43·7
1912.											
January	20	34·0	24·2	27	1·94	·28	1	34·7	15	3·75	79·0
February	21	35·0	19·2	10	9·00			21·5	16	2·15	63·3
March	19	43·0	14·2	6	15·28	·23	2	21·7	10	2·40	165·3

The thermometers were only put up on May 8 and the sunshine recorder on September 21.

I have the honour to be, sir,
Your obedient servant,

GUS. LANGELIER.

EXPERIMENTAL FARM FOR MANITOBA

REPORT OF W. C. McKILLICAN, B.S.A., *Superintendent.*

BRANDON, MAN., March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to present herewith the twenty-fourth annual report of the Experimental Farm for Manitoba, at Brandon.

CROPS ON THE EXPERIMENTAL FARM.

Seeding began the last week of April; all crops were sown rather later than the average date. The dry weather in the early part of the summer reduced grain yields considerably, but induced early ripening. Wheat on summer-fallow and corn land was a good crop, and on stubble land fairly good. Oats were below average yield. Barley yielded well, due to the fact that it was sown chiefly on corn land.

Harvest and threshing were severely interfered with by continuous wet weather, and the quality of all kinds of grain lowered thereby.

Grass and clover crops were a fair yield, and alfalfa excellent.

The late rains greatly benefited the corn and root crops. Excellent yields were obtained, and roots and silage of excellent quality were stored for winter feeding.

Plums, currants and strawberries yielded profusely. There were very few apples this year and only a moderate crop of raspberries.

VARIETY TESTS.

The usual tests of varieties of cereal crops, corn and field roots, were conducted this year. The results of these tests have been reported in Bulletin No. 71. I shall not therefore report them here, but shall give the average results of these tests for five years.

SPRING WHEAT.

Eight varieties were sown in uniform test plots. The average results for five years are as follows:—

SPRING WHEAT—Five Year Average.

Variety.	Character of Head.	Average No. of Days Maturing.	Average Strength of Straw.	Average Immunity from Rust.	Average Weight per Bushel.	Average Yield per Acre.
					Lbs.	Bush. Lbs.
Marquis (average of 4 years)	Bald	106	Stiff	Very good	63·06	45 27
White Fife	"	115	"	Good	61·18	43 8
Bishop	"	107	Fairly stiff	"	60·1	42 2
Red Fife	"	114	Stiff	"	61·25	41 55
Preston	Bearded	109	"	Fairly good	61·26	41 52
Stanley	Bald	110	"	"	59·4	39 32
Huron	Bearded	109	"	"	60·7	37 46
Early Red Fife (average of 2 years)	Bald	109	"	Bad	59·25	37 50

Marquis has now established itself as the best of the early wheats that have been brought out by the Experimental Farms. Not only are the results of plot and field trials very satisfactory, but the milling and baking tests, as reported by the Dominion Cerealist, show it to be the equal of Red Fife for bread-making. It has therefore superseded Preston, Stanley, Huron and other early wheats formerly recommended for northern districts.

The selection of Red Fife, known as Early Red Fife, while a few days earlier than Red Fife, has shown itself to be very subject to rust and will now be abandoned.

In addition to these older varieties, eight new varieties recently produced by the Dominion Cerealist were tested for the first time. These varieties are as yet unnamed. When further tests bring out which are the more suitable for propagation, the Cerealist will name them, and the public will be given the results of tests.

OATS.

Eighteen varieties of oats were tested on uniform test plots. The averages for five years are as follows:—

OATS—Five Year Averages.

Variety.	Colour of Grain.	Average No. of days Maturing.	Average Strength of Straw.	Average Weight per Bushel.	Average Yield per Acre.	
				Lbs.	Bush.	Lbs.
Improved American	White	99	Stiff	38	107	16
Banner	"	99	"	37·92	106	18
Danish Island	"	99	Fairly stiff	37·9	106	03
Irish Victor	"	98	Stiff	36·95	100	01
Siberian	"	99	"	37·4	99	11
Twentieth Century	"	98	"	39·14	98	19
Golden Beauty	Yellow	102	Medium	37·7	97	22
Abundance	White	100	"	37·6	97	17
Swedish Select	"	98	Fairly stiff	39·7	96	15
Thousand Dollar	"	98	"	39·7	95	25
Improved Ligowo	"	97	"	39·6	91	27
Pioneer	"	102	"	38·6	87	32
Daubeney	"	89	Stiff	35·7	74	33
Regenerated Abundance (average 3 years)	"	95	Fairly stiff	40	93	25
Alsasman (average of 3 years)	"	95	Stiff	40·16	89	11
Gold Rain (average of 2 years)	Yellow	97	"	41 25	87	17
Victory (average of 2 years)	White	97	"	41·5	83	33
Orloff (average of 3 years)	Yellow & White	87	"	34·5	78	33

SIX-ROW BARLEY.

Eleven varieties of six-row barley were grown in uniform test plots. The average results for the last five years are as follows:—

Variety.	Average No. of Days Maturing.	Average Strength of Straw.	Average Weight per Bushel.	Average Yield per Acre.	
			Lbs.	Bush.	Lbs.
Mensury	85	Fairly stiff	48·9	63	02
Odessa	85	Medium	48 95	62	14
Yale	85	Fairly stiff	48·7	61	28
Mansfield	85	"	47·75	59	10
Claude	85	"	47·7	57	18
Albert	84	"	50·5	56	04
Trooper	86	"	49·36	53	38
Nugent	85	"	49·05	52	36
Stella	86	"	48·75	50	38
O.A.C. No. 21, (average of 4 years)	84	Stiff	47·3	63	39
Manchurian (1 year only)	85	Fairly stiff	46	76	22

Manchurian and O. A. C. No. 21 are two new sorts that appear very promising. Manchurian is a selected strain of Mensury, grown from a selection by Dr. C. E. Saunders, Dominion Cerealist. O. A. C. No. 21 is a selection made by Professor C. A. Zavitz, of the Ontario Agricultural College. Both appear more uniform and more true to type than the parent stock. The Manchurian appears to be the heavier yielder of the two, and O. A. C. No. 21 a little earlier and a little stiffer in the straw.

TWO-ROW BARLEY.

Seven varieties of two-rowed barley were grown in uniform test plots. The average results for the five years are as follows:—

Variety.	Average No. of Days Maturing.	Average Strength of Straw.	Average Weight per Bushel.	Average Yield per Acre.	
			Lbs.	Bush.	Lbs.
Canadian Thorpe	90	Fairly stiff	50·45	61	08
Swedish Chevalier	92	Weak	50·1	60	46
Standwell	91	Rather weak	49·2	60	44
Jarvis	89	Fairly stiff	49·59	54	08
Clifford	87	Stiff	48·6	48	42
Beaver	89	Fairly stiff	50	46	34
Hannchen (average of 2 years)	89	Medium	50·5	64	07

FIELD PEAS.

Twelve varieties of field peas were grown in uniform test plots. The averages for five years are as follows:—

Variety.	Size of Pea.	Average No. of Days Maturing.	Average Yield per Acre.	
		Lbs.	Bush.	Lbs.
Mackay	Medium	119	48	43
Prince	"	120	47	27
Paragon	"	120	45	55
Gregory	Large	119	45	11
English Grey	Medium	122	43	43
Picton	Small	120	41	13
Arthur	Medium	118	40	55
Chancellor	Small	116	40	43
Golden Vine	"	123	40	43
Prussian Blue	Medium	118	38	11
Black-eye Marrowfat	Large	126	35	41
Solo (1 year only)	Medium	113	51	10
Selected Arthur (1 year only)	"	111	34	..

INDIAN CORN.

Nine varieties of field corn were grown in rows 66 feet long and 42 inches apart. The average yield of fodder per acre for five years, is as follows:—

Variety.	Average Stage of Development when Cut.	Average Yield per Acre.	
		Tons.	Lbs.
Longfellow	Silk	19	1,956
Compton's Early	Silk—Early Milk	19	134
Superior Fodder	Tassel	17	1,006
Selected Leaming	Silk	16	1,541
Angel of Midnight	"	15	1,673
Eureka	Tassel—Silk	15	1,004
Champion White Pearl	" "	13	1,562
Northwestern Dent (average of 4 years)	Late Milk—Early Dough	14	462
Quebec Yellow (average of 2 years)	Firm Dough	14	413

Superior Fodder, Eureka and Champion White Pearl are too late for Manitoba climatic conditions. Northwestern Dent, though not as heavy yielding as some, is most satisfactory on account of its earliness.

TURNIPS.

Ten varieties of turnips were grown in uniform test rows. The average yields for five years, are as follows:—

Variety.	Average Yield per Acre.	
	Tons.	Lbs.
Halewood's Bronze Top	27	630
Hall's Westbury	26	1,346
Perfection Swede	25	2,596
Mammoth Clyde	25	230
Magnum Bonum	24	118
Good Luck	22	1,901
Carter's Elephant	22	1,742
Jumbo	21	204
Bangholm Selected (average 4 years)	27	1,132

MANGELS.

Seven varieties of mangels were planted in uniform test rows. The average results for five years are as follows:—

Variety.	Average Yield per Acre.	
	Tons.	Lbs.
Gate Post	29	362
Prize Mammoth Long Red	27	868
Perfection Mammoth Long Red	27	393
Yellow Intermediate	25	776
Half Sugar White	25	326
Selected Yellow Globe	22	503
Giant Yellow Intermediate	19	898

SUGAR BEETS.

Three varieties of sugar beets, suitable for the production of sugar, were planted in uniform test rows. The average results for five years are as follows:—

Variety.	Average Yield per Acre.	
	Tons.	Lbs.
Klein Wanzleben	18	315
Vilmorin's Improved	17	443
French Very Rich	14	1,165

FIELD CARROTS.

Five varieties of field carrots were grown in uniform test rows. The average yields for five years are as follows:—

Vaaiety.	Average Yield per Acre.	
	Tons.	Lbs.
Improved Short White	16	1,407
Mammoth White Intermediate	16	562
Ontario Champion	15	1,067
White Belgian	14	1,080
Half Long Chantenay	13	1,214

POTATOES.

Twenty-nine varieties of potatoes were planted in uniform test rows. The average results for five years are as follows:—

Variety.	Colour.	Form.	Average Earliness.	Average Size.	Average Yield per Acre.	
					Bush.	Lbs.
Ashleaf Kidney	White	Long, flat, smooth.	Late	Large	496	50
Morgan Seedling	Pink & White.	Oval	Medium	"	466	2
Late Puritan	White	Long	Late	"	455	2
Early White Prize	"	Oval	Early	Small to medium.	447	42
Money Maker	"	Long, smooth.	Medium	Medium	443	40
American Wonder	"	Long	Late	Large	440	22
Empire State	"	"	Medium	Medium to large.	435	38
Reeves' Rose	Pink	Oval flat	"	Medium	424	14
Irish Cobbler	White	Round, deep eyes.	"	"	421	18
Carman No. 1	"	Oval flat	"	Large	420	42
Everett	Pink	Long	Early	Medium	402	58
Gold Coin	White	Round	Late	Large	398	56
Rochester Rose	Pink		Early	Small	376	56
Dreer's Standard	White	Oval flat	Medium	Medium	359	28
Vick's Extra Early	"	Round	Late	Small	276	38
Dalmeny Beauty	Yellowish White.	Oval	"	"	230	16
Manitoba Wonder (average of 4 years).	Red	Long	Medium	Medium	435	25
Dooley (average of 4 years)	White	Oval flat	"	Large	419	50
Woodbury's White Rose (average of 2 years).	"	Long, rather coarse.	"	Medium	461	55
Early Ohio (average of 2 years.)	Red	Long	Early	Large	456	30
Hamilton's Early (average 2 yrs)	White	Round	"	Medium	456	30
Peacock's Surprise (average 2 years.)	Russet	Long smooth	Medium	"	416	10
Factor (average of 2 years)	White	Round	Late	Small	350	50
Hard to Beat (average of 2 years)	"	Flat	"	"	254	50
Table Talk (1 year only)	"	Long, flat, smooth.	"	Large	777	22
Early Bovee (1 year only)	Pink	Oval to long	Early	Medium	579	20
Early Harvest (1 year only)	White	Long	"	"	550	..
Saunderson's Seedling (1 year only.)	"		Late	Small	293	20
Ashleaf Kidney (English Type) (1year only)	"	Kidney shape.	Very early	Very small	275	..

Table Talk, a new variety tried this year for the first time, appears to be a very desirable kind. Not only did it produce a phenomenal yield, but the potatoes are of excellent quality.

GRADES OF WHEAT FOR SEED.

An experiment has been continued for four years to determine the comparative value for seed of the various standard and commercial grades of wheat. Samples of these grains were obtained each year from the Chief Inspector of Grain at Winnipeg. These were sown under uniform conditions, and the yields determined.

Grade.	No. of Days Maturing, 1911 only.	Average Weight per Bushel, 3 Years.	Average Yield per Acre, 3 Years.	
		Lbs.	Bush.	Lbs.
No. 1 Hard	111	60½	39	25
" 1 Northern	110	60¼	39	20
" 2 "	111	60	39	25
" 3 "	112	59¾	38	20
" 4 "	112	59½	37	53
" 5 "	113	59¾	36	28
" 6 "	114	59¼	33	5
Feed	115	59	29	53

These results were obtained in well-prepared summer-fallow land where circumstances were favourable toward giving the weak seeds in the low grades a good chance. It is reasonable to suppose that in stubble land or under other less favourable conditions, the variations among the grades would be greater.

THE PREVENTION OF SMUT.

It has already been well proven that it is possible to prevent smut in wheat and oats by treating the seed with a solution of either formaldehyde or copper sulphate, commonly known as bluestone. Some difference of opinion exists among farmers and agricultural authorities as to which of these two preventives is the better, and as to what strength of solution gives the best results. The object of this experiment was to throw some light on these questions, keeping in view the effect of the treatment on the vitality of the seed grain as well as its effectiveness in destroying smut spores.

The seed used was Huron wheat, the product of last year's untreated plot. It was strong, plump seed, but quite badly tagged with smut. The results are as follows:—

Treatment.	No. of Smutty Heads per 1,000	Yield.	
		Bush.	Lbs.
Untreated	161	44	40
Immersed in bluestone, 1 lb. to 4 galls. water	..	38	40
" " 1 " 6 "	..	40	40
Sprinkled with " 1 " 6 "	3	40	..
Immersed in " 1 " 8 "	4	44	..
" " 1 " 10 "	5	44	40
" formalin 1 " 25 "	..	38	40
" " 1 " 30 "	..	46	20
" " 1 " 35 "	..	47	40
Sprinkled with " 1 " 35 "	..	45	20
Immersed in " 1 " 40 "	..	48	40

QUANTITY OF SEED PER ACRE.

An experiment was conducted to ascertain what quantity of seed of wheat, oats and barley gives the best results in regard to yield per acre and earliness. The land used was well prepared summer-fallow, with plenty of moisture. In the case of the wheat, the results are uniform and may be considered as reliable as a single test ever is. Both the oats and barley lodged very badly in all plots. The growth of straw was excessive, and the results are irregular and cannot be considered as of much value.

The results are as follows:—

Amount of Seed per Acre.	No. of Days Ripening.	Yield.	
		Bush.	Lbs.
Wheat.			
2 Bush. per acre	112	45	40
1¾ " "	112	44	40
1½ " "	113	44	20
1¼ " "	113	43	20
1 " "	113	40	20
¾ " "	113	39	20
Oats.			
4 Bush. per acre	126	113	18
3½ " "	122	142	12
3 " "	123	115	10
2½ " "	124	133	22
2 " "	126	133	02
1½ " "	126	123	18
Barley.			
3 Bush. per acre	89	69	28
2½ " "	90	79	08
2 " "	91	81	12
1¾ " "	91	81	32
1½ " "	92	77	24
1 " "	92	83	16

DEPTH OF SEEDING.

An experiment was conducted to determine what depth of seeding is best for wheat and for oats. The wheat was sown on land that grew corn, and was well cultivated the previous year. It was harrowed, but not ploughed. The oats were sown on wheat stubble, spring ploughed, packed and harrowed. The results of the experiment are as follows:—

Depth of Seeding—Wheat.	Yield per Acre.		Depth of Seeding—Oats.	Yield per Acre.	
	Bush.	Lbs.		Bush.	Lbs.
1 inch deep	42	20	1 inch deep	82	12
2 inches deep	42	40	2 inches deep	92	32
3 "	39	40	3 "	90	20
4 "	37	00	4 "	83	18

SOIL PACKING.

The practice of packing the soil by means of a soil packer, is one that is widely advocated throughout Western Canada, and one that is being adopted by many of the farmers of Manitoba. Three distinct types of soil packer are offered by the manufacturers. There is first what is called the subsurface packer or Campbell packer, which consists of a number of heavy iron wheels with wedged-shaped edges. This packer is supposed to reach the subsurface, and to compact sideways as well as downwards, on account of the wedge shape of the wheels. There is then the more widely-used surface packer, or corrugated roller, which differs from the former in that the compacting surface of the wheels is broad and flat and presses wholly on the surface of the ground. Then a third packer, called the combination packer, is intermediate in form between the other two.

The purpose of this experiment was to determine, first, whether soil packing is advantageous at all, second, which type of packer gives best results, third, when the packer should be applied. The land on which the experiment was conducted was well prepared summer-fallow. It was thus impossible to compare packing immediately after the plough, with other times. This, however, is being done for the coming year. The result of this year's test is as follows:—

—	Yield per Acre.	
	Bush.	Lbs.
Unpacked—average of 4 plots	45	25
Surface packer before seeding	51	..
Combination packer after seeding	50	20
Subsurface packer before seeding	53	40
Surface packer after seeding	53	40
Combination packer after seeding	55	00
Subsurfaca packer after seeding	54	40
Surface packer and harrow after seeding	54	..
Combination packer and harrow after seeding	55	..
Subsurface packer and harrow after seeding	54	40
Surfaca packer before and after seeding	53	00
Combination packer before and after seeding	52	..
Subsurface packer before and after seeding	55	20

These yields show the decided advantage of using any kind of packer, and any time of application, over no packer. There is not, however, any decided advantage in favour of any one type of packer over the others.

DATES OF SOWING FIELD ROOTS ON THIS FARM.

For many years it has been the custom to sow field roots at two different dates, in order to make a comparison of late and early sowing. The average of these results from five varieties for five years has been taken. The early sowings with mangels were made from May 4 to May 22, depending on the season. The late sowings were approximately two weeks later in each case, running from May 19 to June 5. The varieties of mangels on which these averages have been taken are, Prize Mammoth Long Red, Half Sugar White, Giant Yellow Intermediate, Selected Yellow Globe, and Gate Post.

Time of Sowing Mangels.	Yield per Acre.	
	Tons.	Lbs.
Early sowing	24	1,470
Late sowing	22	770

With turnips, the date of early seeding varied from May 4 to May 22, according to the season, and the late sowing was approximately two weeks later, running from May 9 to June 5. These results are the average for five years on the following five varieties of turnips: Carter's Elephant, Magnum Bonum, Hall's Westbury, Halewood's Bronze Top, Hartley's Bronze.

Time of Sowing Turnips.	Yield per Acre.	
	Tons.	Lbs.
Early sowing	24	1,778
Late sowing	20	1,441

CULTURAL EXPERIMENTS.

The scope of the experimental work on this Farm has been considerably enlarged through the adoption of a system of cultural experiments with grain and fodder crops. This new work will consist of tests of agricultural methods, in distinction to the tests of varieties which have formed such an important part of the work in the past. A block of over 20 acres has been set apart for these cultural experiments and has been surveyed into plots of one-fortieth-acre each. Each experiment is located on a different group of plots and is operated in a rotation, so that each year a fresh series of plots is ready for experimentation, while those previously used go around the rotation, and become prepared for experimental use again.

The land for these plots was surveyed in the spring of 1911. The work in 1911 was largely of a preparatory nature. Most of the experiments require two or more years to perform, and it was therefore impossible to obtain any results the first year. The experimental conditions have been fulfilled on practically all the plots, and in 1912, results will be obtained. The following list shows the scope of the cultural experiments:—

Depth of ploughing. 10 different depths in summer-fallow.
" " 3 different depths in stubble land.
" " 4 different depths in sod.
Treatment of summer-fallow. 17 different methods.
Treatment of stubble land. 13 different methods.
Seeding to grass and clover. 11 different methods.
Breaking up sod from grasses and clovers. 8 different methods.
Applying Barnyard manure. (*a*) On hoed crop—8 different methods compared with summer-fallow.
" " " (*b*) On wheat—7 different methods compared with no manure and summer-fallow.
" " " (*c*) On barley—7 different methods compared with no manure and summer-fallow.
" " " (*d*) On oats—7 different methods compared with no manure and summer-fallow.
Green manuring. 3 different methods compared with barnyard manure and summer-fallow.
Preparation of seed bed. 3 different degrees of preparation.
Soil Packers. (*a*) On summer-fallow—25 different methods.
" (*b*) On spring ploughing—11 different methods.
" (*c*) On fall ploughing—14 different methods.
Depth of seeding. 4 different depths with oats.
" 4 different depths with wheat.
Commercial fertilizers. 8 kinds and combinations, compared with manure, clover, summer-fallow, and no fertilizer.
Underdraining.

ALFALFA AND RED CLOVER.

Alfalfa and Red Clover do very well in Manitoba and deserve much wider use than is made of them at present. The following yields, particularly of alfalfa, are rather unusual, as even in a twenty-acre field of alfalfa sown early in 1910 and not yet at its best, an average yield of 3½ tons per acre was obtained. The following yields are of dry hay, grown from plots sown in 1908 and 1909:—

Variety.	Yield per Acre.				Total Crop.	
	1st Cutting June 21.		2nd Cutting August 7.			
	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
Alfalfa (Grimm's—Sown 1908)	4	300	2	...	6	300
" (Indian Head Seed)	3	800	2	400	5	1,200
" (Grimm's—Sown 1909)	4	200	1	400	5	200
" (Turkestan)	2	1,750	1	800	4	550
" (Common)	2	1,500	1	1,100	3	2,600
" Canadian Purple Flowered	2	700	1	400	3	1,100
" Canadian Variegated Flowered	2	1,100	..	1,600	3	700
" Provence	2	600	..	1,800	3	400
" Frankish	2	200	1	...	3	200
" Montana	2	300	..	1,800	3	100
" Sand Lucerne	2	500	..	1,600	3	100
" North Turkestan	1	1,700	1	...	2	1,700
Orel Red Clover	1	1,500	1	200	2	1,700
Common Red Clover	2	200	..	1,200	2	1,400

INOCULATION FOR ALFALFA AND CLOVER.

Alfalfa, like all other legumes, is able to utilize the nitrogen of the air in its growth and to this is largely due its value as a soil renovator and a fodder. This important fuuction is performed through the medium of bacteria which find lodgement in the roots of the plants. Their presence is indicated by the formation of small nodules or excrescences on the roots, about the size of a pin head. These frequently appear in bunches and are usually found on the younger parts of the roots. The absence of these nodules is an indication that the soil does not contain the bacteria. The alfalfa will grow the first season without these bacteria being present, but it lacks stamina and vigour, and is apt to succumb during the first winter.

Our prairie soils sometimes have these bacteria present naturally, but otherwise it is necessary to inoculate. This can most readily be done by securing soil from a field where alfalfa has been growing successfully and scattering it over the land at the rate of from 100 to 200 pounds per acre. This may be done to advantage immediately before sowing the seed, but it may, if necessary, be distributed after the alfalfa is growing, as it will be gradually washed in with the rain. It is not always necessary to inoculate the land, but it is always advisable, as the chances of success are thereby increased. The Experimental Farm has offered to supply farmers in Manitoba with 100 pounds of inoculated soil, free of cost, the receiver paying the freight only. During the season of 1911, one hundred and twenty-seven bags of inoculated soil for alfalfa were sent out in this way, and four bags of inoculated soil for red clover.

As these crops are no longer an experiment, and farmers wish to try larger areas than one acre, there is a demand for greater quantities of soil. It has been decided, for 1912, to send 100 pounds per acre, with a limit of 500 pounds to any farmer. Also, as one of the railways refuses to accept this material for shipment except when the freight charges are prepaid, it has been decided to collect a uniform rate of 50 cents per 100 pounds, which, when averaged up, will be about sufficient to pay all freight charges inside Manitoba. For this sum the Experimental Farm will pay the freight to any point within this province.

FERTILIZING EFFECT OF CLOVER.

In order to test the fertilizing effect of clover as compared with grasses, some old plots that had grown grasses and clovers for years, were ploughed up and sown with wheat. The land was treated in the same manner on all the plots and the same seed wheat used on all. The following results were obtained, and show very clearly the effect of the clovers in storing fertility in the soil:—

Condition of crop.	Yield per Acre.	
	Bush.	Lbs.
Wheat following Red Clover	37	5
Wheat following Alsike	33	30
Wheat following Western Rye Grass	27	37
Wheat following Timothy	26	47

ROTATION OF CROPS

In the last annual report, the need of more diversified farming and more systematic crop rotation for the province of Manitoba, was discussed in detail. The proposed work in crop rotations that was to be started on the Experimental Farm, was also described. Since then some changes and additions have been made. In the first place, the naming of the various rotations by letters, has been changed so that they conform to a system extending over all the prairie Experimental Farms. The same rotation now has the same letter, no matter what farm it is on, and no letter is used to designate more than one rotation. Also, a rotation that includes alfalfa as a principal crop has been added to the list, and some rearrangement of crops made in one or two other rotations. The revised list of rotations being tested on this Experimental Farm is as follows:—

A. Continuous wheat.

D. *1st year.*—Wheat, sown on summer-fallowed land, manured in fall, and fall ploughed.
2nd year.—Wheat.
3rd year.—Oats.
4th year.—Summer-fallow.

E. The same as D, except that no manure is applied at any time.

F. *1st year.*—Wheat, sown on land that was in clover the previous year, and ploughed in fall after harvest.
2nd year.—Wheat, land manured after harvest and ploughed.
3rd year.—Corn and roots, sown after the land has been well cultivated a number of times, cultivated at intervals during the summer to stimulate growth and destroy weeds.

4th year.—Oats or barley, sown on corn stubble, after it has been well harrowed. Red clover 8 lbs., timothy 3 lbs., and rye grass 4 lbs., sown with the oats or barley.

5th year.—Hay, ploughed as soon as possible after haying and worked at intervals during summer and fall in preparation for wheat.

G. *1st year.*—Wheat, sown on corn stubble that has been harrowed thoroughly, land ploughed after harvest.

2nd year.—Wheat, land ploughed in the fall if in good condition, or left until spring.

3rd year.—Oats or barley, sown with 8 lbs. red clover and 5 lbs. timothy per acre.

4th year.—Clover hay.

5th year.—Pasture, manured in summer and ploughed as soon after July 1 as possible, worked at intervals during the summer and fall to destroy weeds and conserve moisture.

6th year.—Corn and roots, cultivated at intervals throughout the summer to stimulate growth and destroy weeds.

H. *1st year.*—Wheat sown on land that was in pasture the previous year, land ploughed in fall after harvest.

2nd year.—Wheat disced in fall or early spring.

3rd year.—Summer-fallow, ploughed in June and well cultivated.

4th year.—Oats, sown on summer-fallow, with western rye grass 8 lbs., red clover 6 lbs., and alsike 2 lbs.

5th year.—Clover hay.

6th year.—Pasture, manured in midsummer, ploughed and well cultivated during fall.

I. *1st year.*—Flax, sown on land that was in pasture the previous year, land ploughed in fall after harvest.

2nd year.—Oats, disced in fall or early spring.

3rd year.—Summer-fallow, ploughed in June and well cultivated.

4th year.—Wheat, on summer-fallow, sown with western rye grass 8 lbs., red clover 6 lbs., and alsike 2 lbs.

5th year.—Clover hay.

6th year.—Pasture, manured in midsummer, ploughed and well cultivated during fall.

Q. This rotation arranged specially for a sheep farm, is on a piece of very light, poor land at the back of the Experimental Farm.

1st year.—Roots and peas, sown on land that was in green feed and rape the previous year, and manured and fall ploughed the previous fall.

2nd year.—Wheat, sown with a mixture of grasses and clovers.

3rd year.—Hay.

4th year.—Hay.

5th year.—Pasture.

6th year.—Pasture.

7th year.—Pasture, ploughed in midsummer and backset.

8th year.—Green feed and rape.

W. *1st year.*—Wheat, on land ploughed up from alfalfa.

2nd year.—Wheat, manured in fall after harvest.

3rd year.—Corn or roots.

4th year.—Oats.

5th year.—Barley.

6th year.—Alfalfa sown without nurse crop.
7th year.—Alfalfa.
8th year.—Alfalfa.
9th year.—Alfalfa.
10th year.—Alfalfa, ploughed up in midsummer.

For each of these rotations a block of land has been set apart, on which it will be operated from year to year. Each block is divided into as many fields as there are years in the rotation. The fields vary from 3½ acres to 8¼ acres in size, and are thus sufficiently large to give practical farm conditions. This makes the computation of cost and receipts more reliable than could be secured on small plots. The rotation fields, in all, take up more than half the arable land on the Experimental Farm.

During the past year, rotations D, E and G were in operation in full. Rotations F, H, I and Q were in partial operation. Rotation W has not yet been started. The work on these rotations has not progressed far enough to be reported upon as yet. However, one or two facts are already showing themselves quite strongly. One is the great value of corn in a rotation. Not only is it one of the most profitable crops in the rotations, but, after it, the cheapest grain crops are grown. In 1911, wheat, grown after corn, was produced at a cost of 27 cents per bushel, while on summer-fallow or stubble land it costs 45 cents per bushel to produce. Barley, after corn, was produced at the cost of only 16 cents per bushel.

The cost of producing the crop, and the value of the crop, on every field in the rotations in 1911, have been carefully ascertained, and when several years' results are obtained, definite opinions may be formed as to which rotation is best suited to Manitoban conditions.

EXPERIMENTS WITH LIVE STOCK.

In the arrangement of breeds of cattle among the western Experimental Farms, the breed allotted to this Farm is the Dairy Shorthorn. A herd of 20 animals of this breed was sent out from the Central Experimental Farm at Ottawa in June, 1911. The purpose of keeping this type of Shorthorn, is to meet the growing demand among the grain-growing farmers for a useful general-purpose cow, that will give a fairly large flow of milk and at the same time produce a good beef calf. The herd is descended from some of the best English Shorthorn herds, and contains some very good specimens of the dual-purpose type of Shorthorn. The young males, and some of the females, from this herd will be available for purchase at reasonable prices by farmers of the prairie provinces.

The number of cattle on the Experimental Farm at the present is as follows:—

4 cows and 4 heifers, Shorthorn, beef type.
2 bulls, 13 cows and 17 heifers and calves, Shorthorn dairy type.
1 cow and 1 calf, Ayrshire.
1 cow and 1 calf, Grade.
19 feeding steers, Grade.

The record of milk production for the season of 1911-12, is as follows:—

MILK RECORD FOR YEAR ENDING MARCH 31, 1912.

Name.	Breed.	No. of Days Milking.	No. Lbs. Milk.
Snowball	Ayrshire	366	6,555
Buttercup	Grade	300	5,558
Rose	Shorthorn	303	5,328
Jane	"	255	4,246
Poppy	"	302	2,445
Daisy	"	...	1,981

The following cows belong to the herd of Dairy Shorthorns which arrived here from Ottawa on June 18, 1911. The record of their milk production is dated from June 18, and is as follows:—

MILK RECORD OF DAIRY SHORTHORNS FOR PERIOD EXTENDING FROM JUNE 18, 1911 TO MARCH 31, 1912.

Name.	Breed.	No. of Days Milking.	No. Lbs. Milk.
Illuminata 3rd	Dairy Shorthorn	317	5,048
Ottawa Marchioness 5th	" "	215	4,539
Ottawa Janet 3rd	" "	222	4,326
Jessica Elmhurst	" "	242	3,983
Ottawa Marchioness 4th	" "	285	3,915
Ottawa Marchioness	" "	322	3,842
Ottawa Molly 4th	" "	229	3,760
Ottawa Lass	" "	241	3,690
Marchioness 2nd	" "	290	3,661
Duchess 3rd	" "	314	3,652
Molly 3rd	" "	287	3,162
Molly 2nd	" "	272	3,084
Illuminata 4th	" "	258	2,698

STEER FEEDING.

For several years now a test has been conducted at this Experimental Farm to compare feeding steers outside with feeding in stables. This was repeated in 1911 and is again under way in 1912. A new feature was also introduced in a comparison of alfalfa with grain as part of the feeding ration.

Twenty-one steers were purchased in the fall of 1910 at a cost of $33 per head. They averaged 1,053 pounds, which made the purchase price 3·13½c per pound. They were all rising three, and were chiefly Shorthorn and Hereford grades. They were started on feed on November 15, 1910, and shipped on May 1, 1911. Bids were received from quite a number of buyers from Winnipeg, Brandon and other points. The best bid was 6·30 cents per pound made by W. J. Burchill, of Brandon.

Details of the Feeding.

The twenty-one steers were divided into three lots as evenly as possible in regard to size and quality.

Lot 1 was fed entirely outside without any shelter except the natural scrub and bush. They were supplied with water from a well, pumped into a large trough which was kept from freezing by means of a small tank heater. They were fed straw and,

at the last, hay in large racks, which were filled by the sleighload as required. The grain ration was given on feeding tables. They were started on a ration of two pounds per day of mixed oat and barley chop. This was gradually increased to 11 pounds of chop, 1 pound of bran and 2 pounds of oilcake at the finish. From January 1 on, they got 2 pounds of alfalfa hay per day, chopped and mixed with their grain.

Lot 2 was fed in the stable. They received 8 pounds of straw, 35 pounds of corn silage and 15 pounds of roots daily throughout the experiment and received no hay. They were started on a ration of 2 pounds of mixed oat and barley chop on November 15, and this was gradually increased to 10 pounds of mixed chop, 1 pound bran and two pounds oilcake at the finish of the test.

Lot 3 was fed in the stable as well. They got exactly the same feed as lot 2, except that from January 1 they received 3 pounds less per day of mixed oat and barley chop, and in its place received 3 pounds of alfalfa hay. Their fattening ration besides straw, corn and roots, was, therefore, 7 pounds of mixed chop, 1 pound of bran, 2 pounds oilcake and 3 pounds alfalfa hay per day at the finish of the test. The average amount of concentrated grain feed for the whole period was thus less than 4 pounds per day.

At selling time all three lots looked equally well and were equally saleable. There was not a steer that was not in prime condition. The results obtained are given concisely in the following tabulated statement. The usual custom of balancing labour and interest against manure has been followed. So far as the results of the whole experiment are concerned this is a safe rule, as the manure is certainly worth the labour and the interest on capital involved. It is not, however, a fair comparison between outside and inside feeding, as the work involved in handling a bunch of steers in a stable is much greater than it is for an outside lot.

The interest on investment in stabling accommodation is also a considerable item. These points should be kept in mind in comparing these lots.

RESULTS OF FEEDING EXPERIMENT, 1910-11.

—		Lot 1.	Lot 2.	Lot 3.
No. of steers in lot		7	7	7
" days in experiment		167	167	167
Average weight at beginning of experiment	Lbs.	1,042	1,061	1,056
" " end of experiment	"	1,256	1,285	1,277
" gain	"	215	224	216
" gain per day	"	1·28	1·34	1·29
Quantity of straw eaten by lot during period	"	24,000	9,380	9,380
" hay " "	"	10,000	.....	.....
" alfalfa hay " "	"	1,596	.....	2,835
" corn silage " "	"	.....	39,900	39,900
" roots " "	"	.....	18,725	18,725
" fmeal " "	"	9,032	7,318	4,483
Total cost o fee d	$	144 81	138 91	127 56
Cost of feed per head	"	20 67	19 84	18 22
" " per day	cts.	12 4	11·9	10·9
Cost to produce 1 lb. gain	"	9·6	8·9	8·4
Original cost of steers	$	228 57	232 81	231 55
" plus cost of feed	"	373 38	371 72	359 11
Total receipts from sale at 6·30c. per lb	"	526 68	538 65	532 98
Net profit on lot	"	153 30	166 93	173 87
" per steer	"	21 90	23 86	24 84

Profits in steer feeding.

The striking results of this experiment are, first, a demonstration of the opportunity for western farmers to make better use of their straw and coarse grains by fattening steers at a handsome profit.

Stabling not essential.

Secondly, it is possible to get those results without going to the expense of building stables. Though the gains are better when stabling can be used, they are not sufficient to justify heavy outlay for stables to be used for this purpose alone.

Feeding value of alfalfa.

Thirdly, probably the most striking illustration is that of the wonderful feeding value of alfalfa. The steers that had their grain ration reduced by three pounds and got in its place alfalfa hay, looked just as well as the others, and made practically the same gains. They made the gains more economically. Even though the alfalfa hay was valued at $12 per ton, which will seem to most people a high valuation for unbaled, undelivered hay, yet the steers fed partly on it made their gains considerably cheaper than the ones fed chopped oats and barley valued at 1 cent per lb.

Another experiment of the same kind has been started during the season of 1911 and 1912. Nineteen steers have been divided into two lots; twelve animals are being wintered outside as Lot 1 in the above experiment and some are being wintered in the stable as Lot 2. Satisfactory gains are being made by both lots but at the end of the fiscal year the experiment is not complete.

SWINE.

The stock of swine on hand at present consists of the following animals:—

Yorkshires: 1 boar, 2 sows, 8 young pigs.

Berkshires: 2 sows.

Crossbreeds: 13 young pigs.

No experiments in feeding swine have been conducted during the past year, on account of insufficient number of pigs of equal age.

SHEEP.

The flock of sheep on hand at present consists of the following animals exclusive of newly-born lambs:—

Oxford Down: 1 ram and 2 ewes.

Grade: 30 breeding ewes, and 122 fat sheep.

EXPERIMENT IN FATTENING SHEEP.

In order to obtain information in the feeding of western range sheep by wheat farmers, as a means of disposing of by-products of the farm, an experiment has been conducted. One hundred and twelve range ewes were purchased in November, 1911. These were all fed wheat screenings, consisting of about half shrunken wheat and half wild oats, bought at $16 per ton from a local flour mill. The sheep were divided into four lots. Lot 1 was confined in the sheep barn, sheltered from cold and storm, but given no exercise. Lots 2, 3, and 4 were fed in open paddocks without shelter, but had open sheds to shelter in when not feeding. The three lots fed outside were all fed the same grain, but a comparison was made in the three kinds of roughage. Lot 2 were given alfalfa, lot 3 hay of mixed grasses, and lot 4 straw. Lot 1 received the same feed as lot 3, the only difference being that the hay was weighed to them each day while those outside ate from a large stack.

The sheep were started feeding on December 5, receiving ¼ pound per day per sheep of wheat screenings, and all the roughage they would eat. The screenings were increased from time to time, and at the end of the experiment, each sheep was receiving 1¼ pounds per day of grain.

They also were all given 2 pounds per day of frozen turnips throughout the experiment. Frozen turnips are commonly supposed to be dangerous; they were therefore fed in small quantities, and a watch for ill effects was kept on the sheep. They ate the turnips quite well until they began to thaw in the spring and no ill effect was observed at any time.

The prices charged for feed in computing cost are:—

Wheat screenings (actual cost)	$16 00 per ton.
Alfalfa hay (rather badly weathered)	10 00 "
Grass hay (rather badly weathered)	8 00 "
Straw	2 00 "
Frozen turnips	1 50 "

RESULTS OF SHEEP FEEDING EXPERIMENT 1911.

—	Lot 1. Fed Hay in stable.	Lot 2. Fed Alfalfa outside.	Lot 3. Fed Hay outside.	Lot 4. Fed Straw outside.
No. of sheep in experiment	10	66	18	18
" days in experiment	126	126	126	126
Total weight at beginning of experiment. Lbs.	981	6,203	1,785	1,768
" end of experiment "	1,150	8,570	2,055	2,025
Gain during period "	169	2,367	270	257
Gain per head "	16·9	35·9	15	14·3
" day per head "	0·14	0·29	0·12	0·12
Quantity of grain eaten by lot "	1,225	8,085	2,205	2,205
" hay (grass) eaten by lot "	1,860	.....	5,400	.....
" alfalfa " "	.....	30,000	.....	5,400
" frozen turnips " "	2,480	16,000	4,000	4,000
Total cost of feed $	18 10	226 68	47 64	26 04
Cost of feed per head "	1 81	2 83	2 65	1 45
" " per day cts.	1·4	2·2	2·1	1·1
" 1 pound gain "	10·7	9·6	17·7	10·1

The sheep have not been sold as yet so that it is impossible to report on the profit or loss of the experiment. It is not likely that it will be possible to show a profit, as too large a price was paid for them in the fall. It was impossible to buy at the right time on account of lack of funds. When funds were made available it was almost impossible to get sheep, and these were bought at a high price for the sake of getting results on a comparison of feeds, even though the operations were carried on at a loss. The price paid was $5.75 each for sheep that averaged 98 pounds weight. In order to have a chance to make a profit, feeders should get this type of sheep for at least $1 each less than this. These prices are for animals laid down in Manitoba. It is proposed to feed lambs in the coming season to see if it is not possible to make more economical gains with them.

The striking result of this experiment is the much greater gains made by the sheep fed on alfalfa than by those fed on hay. They made over twice as great gains. The advantage of the stable-fed sheep over the outside ewes in the cost of gain is largely due to the fact that the ewes in the stable were fed what they would eat each day, while those outside were fed from a large rack that was filled by the sleigh-load, and were very wasteful. Those fed alfalfa were also fed in the same way and greatly increased the cost of feed by wastefulness.

HORSES.

Horses have been kept for work only. The number of work horses has been increased by two during the year. Larger horse force was found to be necessary on

account of the additional work incidental to the cultural experiments. There are twelve heavy horses and two drivers on the Farm at present.

POULTRY.

Small flocks of three breeds are kept, Barred Plymouth Rock, Buff Orpington and Silver Grey Dorking. The number on hand at present is:—

Barred Plymouth Rock	1 cock and 28 hens.
Buff Orpington	6 hens
Silver Grey Dorking	7 "

BEES.

Four hives of bees were brought out of winter quarters in 1911. They multiplied during the season to fourteen hives; these have again been brought through the winter in good condition. The apiary has now been brought up to nearly its former size, and will henceforth be handled to produce honey rather than to multiply.

The average weight of the hives on November 9, when they went into winter quarters, was 44 pounds.

VEGETABLES.

ASPARAGUS.

The asparagus bed planted in 1908, produced a fine crop of shoots. This vegetable is one that might well be brought into more general use. It requires very little work, and produces the first fresh vegetable of the season, being ready for use on May 5 this year.

CARROTS.

Four varieties of carrots were grown; they produced satisfactory yields. The seed bought as Chantenay and as Oxheart did not produce true to type, and yielded carrots not suitable for table use. The yields per acre, calculated from 1 row 66 feet long, are as follows:—

Variety.	Yield per Acre.		Remarks.
	Bush.	Lbs.	
Half Long Chantenay	931	20	Excellent size, shape and quality; very uniform.
Oxheart	909	20	Not true to name.
Chantenay	792	..	A white carrot not true to name.
Early French Horn	660	..	Good early carrot, very uniform and good quality.

PARSNIPS.

Only one variety, the Hollow Crown, was grown this year. It produced a large crop of excellent quality. Part of the crop was harvested in the fall for winter use, and part was left in the ground until spring. That left in the ground came out in first-class condition. The yield per acre estimated from 60 feet of a row, was 416 bushels 40 pounds.

ONIONS.

Several varieties of onions for general use were grown from seed. In the case of Large Red Wethersfield and Yellow Globe Danvers, tests of various sources of seed were made. Dutch Sets and Silver-skin onions, the latter for pickling, were also grown. Onions of all kinds did very well. The yields were as follows:—

Variety.	Yield per Acre.		Description.
	Bush.	Lbs.	
Southport Red Globe	469	20	Round, red.
Yellow Globe Prizetaker	451	..	Round, yellow.
Sutton's Selected Ailsa Craig	434	40	Round, white, rather late.
Large Red Wethersfield (Vilmorin)	410	40	Flat, red, early.
Large Red Wethersfield (Steele-Briggs)	363	..	"
Large Red Wethersfield (Ont. Seed Co.)	330	..	"
Yellow Globe Danver's (Ont. Seed Co.)	399	40	Round, yellow, early.
Yellow Globe Danver's (Vilmorin)	344	40	"
Salzer's Wethersfield	366	40	Flat, red.
Johnson's Dark Red Beauty	300	40	"

BEETS.

Nine varieties of beets were grown; they produced heavily but were inclined to be coarse-grained.

Variety.	Yield per Acre.		Description.
	Bush.	Lbs.	
Eclipse	968	..	Very coarse, early.
Ruby Dulcet	946	..	Good colour, but coarse texture.
Early Blood Red Turnip	946	..	Very coarse, early.
Meteor	806	40	Uniform size and shape, fair colour and quality.
Egyptian	667	20	Coarse, early.
Early Flat Egyptian	594	..	Not true to name, long and unshapely, early.
Rennie's Intermediate	579	20	Rather coarse, fair colour.
Black Red Ball	528	..	Small, excellent quality, shape and colour.
Sutton's Dark Red	300	40	Small long beet, excellent quality.

KOHL RABI.

Early Erfurt Kohl Rabi was grown this year. It was sown on May 9, and was ready for use on July 20. It produced abundantly.

CABBAGE.

Three varieties of early cabbage were grown. They were sown in hotbeds on April 10, and transplanted to the garden on June 6. The Extra Early Paris Market was ready for use on July 25, the Extra Early Midsummer Savoy on August 1, and the Early Jersey Wakefield on August 2. The Extra Early Paris Market and the Early Jersey Wakefield both produced cabbage of first-class quality, the other variety is not quite so good.

Thirteen late varieties were sown at the same time; they produced well.

Variety.	Weight of Specimen Head.
	Lbs.
Flat Swedish	22½
Large Late Flat Dutch	22
Amager	20½
Lubeck	20
Danish Ballhead	20
Danish Summer Ballhead	17½
Copenhegen Market	16
Winningstadt	15½
Madgeburg	15½
Improved Amager Danish Roundhead	15
Red Danish Stonehead	9
Red Danish Delicatesse	8½
Extra Dark Red Dutch	6

CAULIFLOWER.

The following six varieties of cauliflower were grown: Sutton's White Queen, Extra Selected Early Erfurt, Earliest Dwarf Erfurt, Danish Giant or Dry Weather, Earliest Snowball, Early Snowball. The Extra Selected Early Erfurt was the first to be ready for use, and Sutton's White Queen produced the finest specimens.

SQUASH, PUMPKINS, MARROWS, MELONS, CITRONS, ETC.

The season was too cool for these crops to do well. Only the earliest varieties matured, and they ripened but few specimens. The Mammoth Whale squash, and the Long White Bush marrow ripened fruit.

LETTUCE.

Twelve varieties of lettuce were grown, and all except the Red Edged Victoria did very well. The following are worthy of special mention. Wheeler's Tom Thumb, very early, good quality, small; Iceberg, excellent quality, productive and long season. Cos Trianon, late, excellent quality.

PEAS.

Ten varieties of peas were grown for use as green peas. They produced well, and there were peas at the proper stage for use from July 10 until September.

TOMATOES.

The season was not very favourable to tomatoes; a severe sandstorm early in the season injured the stems, and nearly cut off some of them. Then the very cold weather in July and August was not conducive to ripening.

A comparison was made between staking and pruning the plants, and leaving them to grow in their natural habit. The only ripe fruit produced was on the vines that were staked and pruned. The following are the yields of three plants:—

RESULTS OF TESTS WITH TOMATOES, 1911.

Three Plants of each Variety.	Pruned.						Unpruned.					
	Ripe.		Green.		Total.		Ripe.		Green.		Total.	
	Lbs.	Ozs	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.
Earliana C E.F. (home grown seed)....	2	3	6	10	8	13	..	8	16	12	17	4
" C.E.F.....	2	9	5	12	8	5	..	..	23	..	23	..
" Burpee.....	2	..	4	4	6	4	..	..	9	..	9	..
" Ontario Seed Co.....	1	12	8	4	10	..	..	..	15	..	15	..
" Northern Adirondack.....	..	..	5	3	5	3	..	..	7	8	7	8
Early Jewell, Ontario Seed Co.....	2	3	3	12	5	15	..	..	8	..	8	..
" " Burpee.....	1	14	9	4	11	2	..	..	17	8	17	8
Rennie's XXX Earliest.....	..	..	4	12	4	12	..	..	25	8	25	8
Florida Special.....	..	..	5	4	5	4	..	..	5	8	5	8
First of All.....	..	5	1	2	1	7	..	..	14	..	14	..
Bonny Best.....	..	..	8	8	8	8	..	..	21	..	21	..
Red Pear.....	..	..	1	4	1	4	..	..	4	..	4	..

TABLE CORN.

Nine varieties of table corn were grown. Early Malakoff, C. E. F. strain, proved to be the earliest, being ready for use on July 30. On account of the cool weather, all varieties were later than normal, but the absence of early fall frosts allowed of their use to a much later date than usual. Golden Bantam and the Chase produced corn of excellent quality.

CELERY.

The celery was sown in hot-beds on April 11, and transplanted to the garden on June 15. It was only a moderate success this year and was not of first-class quality. Paris Golden Yellow was the best.

FRUITS.

STRAWBERRIES.

Ten varieties of strawberries have been growing since 1909. They all wintered well and some of them produced a good crop of fruit of first-class quality. The following are the yields obtained from an 85-foot row of each variety:—

Variety.	Size of Berry.	Yield.	
		Lbs.	Ozs.
Crescent.....	Small to medium.....	22	4
Pocomoke.....	Large.....	16	11
Entrance.....	Medium.....	6	8
Lovett.....	Medium to large.....	5	11
Tennessee Prolific.....	"	5	6
Clyde.....	"	4	15
Splendid.....	Large.....	4	13
Senator Dunlap.....	"	3	15
Bederwood.....	Medium.....	3	14
Uncle Jim.....	Large.....	1	10

APPLES.

It is still impossible to claim any great success in the growing of apples. No standard apple trees produced any fruit this season, and many of the trees are in an unhealthy condition due to severe winter-killing. Some of the hardier cross-bred apples produced fruit but only in small quantities. The spaces in the orchard, caused by deaths, were again filled with young trees, sent by the Dominion Horticulturist from Ottawa, and from Winona, Ont.

PLUMS.

Plums produced freely this year. Some of the best strains of native plum were ripe on August 15. The best selections of native plum produce fruit of very good quality, and as they are very hardy, every farmer in Manitoba should have some trees of this type. Seedlings of the Cheney plum also produced heavily and the absence of early frosts allowed them to mature. Some of their fruit was of excellent quality.

FLOWERS.

The usual variety of annuals were started in hot-beds and transplanted to the flower garden. They produced a great display that was much admired. Sweet peas sown in the open on April 20 did very well and gave a profusion of bloom which lasted till September 20.

The perennials again proved a great source of delight; from the time the iris started in the early spring, till the autumn daisies were destroyed by the late fall frost, the perennial beds were a constant source of bloom. Pæonies were especially pleasing this year. The perennials are the kind of flower that the farmers of the West should use more extensively. Once planted they require little attention, and bloom year after year, each in its season. The following kinds of perennials are quite hardy: Iris, Pæony, Larkspur, Rosa rugosa, and Autumn Daisy. There are many others that may be successfully grown, but these five are so specially hardy and in themselves extend the blooming period so well over the whole summer, that the simplest prairie home might well have them.

BULBS.

A consignment of bulbs sent by the Dominion Horticulturist were planted in the fall for winter and spring bloom. For interior use, the hyacinths and daffodils were very successful, and for outside planting tulips are the hardiest. They produced an excellent show of bloom.

AGRICULTURAL MEETINGS.

During the year, I attended a number of agricultural meetings. Seed Fairs were attended at Swan Lake, Morden, Deloraine, Hartney, Birtle, Binscarth and Russell. At each of these points I addressed an audience of farmers on agricultural topics; the subjects most frequently discussed were 'Rotation of Crops,' 'Corn Growing,' 'Alfalfa.' I gave an address on 'Growing and Feeding Alfalfa' at the annual meeting of the Manitoba Cattle Breeders' Association, on March 5. I acted as judge at the Saskatchewan Provincial Seed Fair at Saskatoon and at the Manitoba Provincial Seed Fair at Brandon.

CORRESPONDENCE.

Since the last report 3,715 letters were received and 3,757 dispatched.

DISTRIBUTION OF SAMPLES.

The distribution of samples of potatoes and of trees and shrubs has been continued and, during the year, the following material has been sent out:—

Seedling trees and shrubs, packages	126
Potatoes in 3-lb. bags	115

METEOROLOGICAL RECORD.

Months.	Highest Temperature. F.	Lowest Temperature. F.	Total Rainfall.	Total Snowfall.	Hours. Bright Sunshine.
1911.			Ins.	Ins.	
April	83·8	11	.30	2	241·9
May	90	21	2.18	5	208
June	96	35	1.97		195·5
July	92·5	40	2.91		275·3
August	87·7	32	5.84		215·3
September	76·5	21	1.43		165·6
October	76·5	7	1.60		125 6
November	50·8	−28·2		6	132 9
December	36·5	−35		3	47·7
1912.					
January	25·9	−45		.3	135
February	34	−27·7		.3	89·1
March	41·9	−25·2	.07	2	201·2
			16.30	18.6	2063·1

Reckoning 10 inches of snowfall as equivalent to one inch of rainfall, the total precipitation for the year ending March 31, 1912, was 18·16 inches.

I have the honour to be, sir,
Your obedient servant,

W. C. McKILLICAN,
Superintendent.

EXPERIMENTAL FARM FOR SOUTHERN SASKATCHEWAN

REPORT OF ANGUS MACKAY, SUPERINTENDENT.

INDIAN HEAD, SASK., March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit to you the twenty-fourth annual report of the Experimental Farm for Southern Saskatchewan, at Indian Head, for the year ending March 31, 1912.

That past season was, without exception, the most unfavourable for the country that has taken place for the past twenty-four years. While crops over the entire Province were very promising up to the 1st of August, cold and wet weather then set in, bringing rust and frost before the wheat crop had matured, causing great loss in yield and quality.

Wet weather seriously delayed the ripening, harvesting and threshing, and at present a great deal of the grain is in stooks or uncut.

Had the August weather been at all favourable, one of the largest crops ever grown in any country would have been reaped.

The winter of 1910-1911 was, on the whole, favourable, with a large quantity of snow, while the winter now about over has been remarkable for entire absence of storms, little snow and excessive cold during part of January, and fine weather both before and after the severe cold spell.

Seeding was general about the middle of April throughout the Province and grain made good progress and was very promising every where until rust and frost visited the country.

With the exception of 1901, the crops on the Experimental Farm were never more uniformly good than in the year just past. While rust and frost, chiefly the former, injured the wheat and peas in yield and quantity, the oats, barley, roots, grasses, clovers, potatoes, etc., were all good.

Seeding commenced on April 17, harvest on August 17 and threshing on September 19. Threshing was completed on October 23, over one month later than the previous year.

I am sorry to report the total loss by fire, on the 9th of January, of the barn and horse stable, caused by an explosion of gasoline while starting engine for cutting and grinding feed for the stock. The fire started at 11 a.m. The stock of all sorts was safely got out of the building excepting one brood sow that inhaled too much smoke and died a few days afterwards.

All machinery in the barn including threshing, fanning mills, cutting box, etc., were destroyed.

About four thousand bushels of grain and fifty to sixty tons of hay were lost. The grain included nearly all seed sold, and that for this year's requirements.

In addition to the loss of barn and stable, the new silo and engine-house were consumed. The contents of the silo were not injured, but the engine was greatly damaged.

An outside office is now being erected, and as soon as weather permits, new and improved buildings will be erected in the place of those destroyed.

TESTS OF VARIETIES.

Eighteen varieties including eight unnamed sorts produced by the Dominion Cerealist, were sown on the 19th of April, in plots of one-twentieth acre each, at the rate of one and one-half bushels of seed per acre.

The weather was fine during seeding, and the land being in good condition, grain came up evenly.

Rust injured nearly all varieties, Preston and Marquis alone being unhurt, Early Red Fife, which did so well in 1910, was entirely ruined.

Frost caught some of the late sorts but no great injury was done as rust had preceded it.

SPRING WHEAT—UNIFORM TEST PLOTS—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per Measured Bushel after Cleaning.
							In.	Lbs.	Bush.	Lbs.	Lbs.
1	Bishop	April, 19	Aug. 29	132	38	10	3	2,880	48	..	57
2	Early Red Fife	" 19	" 29	132	36	10	3½	1,540	25	40	55
3	Huron	" 19	" 31	134	37	10	3½	2,720	45	20	57
4	Kubanka (durum wheat)	" 19	Sept. 5	139	53	6	3¾	2.040	34	..	57
5	Marquis	" 19	Aug. 28	131	40	10	3½	3,020	50	20	61½
6	Preston	" 19	" 29	132	42	8	3¼	2,740	45	40	60
7	Red Fife, H	" 19	Sept. 4	138	40	10	3¼	1,580	26	20	57
8	Stanley, A	" 19	Aug. 31	134	39	8	3½	2,720	45	20	56
9	White Fife	" 19	Sept. 6	140	41	6	4½	2,080	34	40	54
10	Red Fife (from Chemist)	" 19	" 4	138	39	8	3¼	2.120	35	20	57
11	Huron (treated with Formalin)	" 19	Aug. 31	134	38	10	3½	2,720	45	20	57½
12	" (" " Blue stone)	" 19	" 31	134	38	10	3½	2,900	48	20	57
13	" (untreated)	" 19	" 31	134	38	10	3½	2,980	49	40	57
14	83 E	" 19	" 17	120	39	10	2½	2,360	39	20	60
15	107 A	" 19	" 22	125	40	10	3¼	2,220	37	..	58
16	128 B	" 19	" 22	125	41	9	3	2,480	41	20	58½
17	135 B	" 19	" 10	113	32	10	2½	2,320	38	40	64
18	195 F	" 19	" 21	124	41	9	3	2,580	43	..	61½
19	354 C	" 19	" 21	124	41	10	2½	2,460	41	..	59¼
20	378 A	" 19	" 21	124	44	8	2½	2,200	36	40	58
21	397 D	" 19	" 19	122	38	10	2½	2,240	37	20	59

The land was rye grass sod broken and backset the previous year.

WHEAT IN FIELD LOTS.

Five varieties of wheat were grown in field lots, Red Fife, Early Red Fife, Marquis, Preston and Huron, all but Early Red Fife giving good yields.

On fallowed land, frost overtook all varieties before being fully matured. Marquis wheat on pea and stubble land escaped frost entirely, while on fallow it was frozen except on high parts of the field.

Red Fife on new land broken and backset, gave a large yield, with all but that on high ground frozen. Preston and Huron were also frozen except on high parts of the field.

WHEAT—FIELD LOTS—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average length of Straw, including Head.	Strength of Straw on a scale of 10 points.	Average length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per Measured Bushel after Cleaning.
					In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Marquis (fallow)	April 18	Aug. 26	130	47	10	3¼	2,400	40	..	62·3
2	Marquis (pea land)	" 17	" 16	121	39	10	3½	2,683	44	43	65·6
3	Marquis (stubble)	" 22	" 18	118	44	10	3¼	2,425	40	25	65·6
4	Red Fife (backsetting)	" 18	Sept. 2	137	46	10	3	2,890	48	10	62·1
5	Red Fife (fallow)	" 24	" 8	137	48	10	3	2,497	41	37	62·2
6	Red Fife (root land)	" 24	Aug. 31	129	50	10	3	2,608	43	28	63
7	Red Fife (stubble)	" 25	Sept. 2	130	41	10	2½	1,980	33	..	58·8
8	Red Fife (stubble)	" 25	" 2	130	40	10	2⅓	1,567	26	7	58·8
9	Early Red Fife (fallow)	" 17	Aug. 30	135	49	10	2½	1,122	18	42	53·5
10	Huron (fallow)	" 20	" 31	133	52	10	3¾	3,060	51	..	60·2
11	Preston (fallow)	" 19	" 26	129	49	10	3¾	2,610	43	30	61

SPRING WHEAT—Average and Total Yields.

Variety.	Cultivation.	Acres.	Yield per Acre.		Total Yield.	
			Bush.	Lbs.	Bush.	Lbs.
Marquis	Fallow	10·81	40	..	435	33
Marquis	Pea Land	7·09	44	43	315	45
Marquis	Stubble	6·30	40	25	261	10
Red Fife	Backsetting	12·16	48	10	585	45
Red Fife	Root Land	5·06	41	37	224	25
Red Fife	Fallow	5·04	43	28	234	31
Red Fife	Stubble	5·08	33	..	191	38
Red Fife	"	5·08	26	7	151	30
Early Red Fife	Fallow	10·96	18	42	205	16
Preston	"	3·13	43	30	136	21
Huron	"	2·86	51	..	145	51
		73·57			2,887	45

Average yield per acre : 39 bushels, 15 lbs.

SPRING WHEAT—Five Years' comparison of Field Lots.

The average yield per acre and the time taken to mature of four varieties of wheat grown in field lots under similar conditions for the past five years, are given below.

Variety.	Average Days to Mature.	Days earlier than Red Fife.	Average Yield per Acre.	
			Bush.	Lbs.
Huron	127·8	7·8	35	19
Marquis	126·8	8·8	39	24
Preston	128·6	7	35	59
Red Fife	135·6	...	27	24

OATS—TEST OF VARIETIES.

Fifteen varieties were sown on the 15th of May on hay land broken and backset the previous year. Two bushels of seed were sown per acre.

All gave heavy yields of grain and large crops of straw, which was badly lodged by winds and rain.

Frost overtook all but two varieties before they were fully matured. Germination was not greatly injured.

OATS—UNIFORM TEST PLOTS—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening	No. of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per Measured Bushel after Cleaning.
					In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Abundance	May 5	Aug31	118	54	8	9	4,400	129	14	38½
2	Abundance, Regenerated	" 5	" 31	118	53	8	9	4,280	125	30	40½
3	Banner	" 5	Sept 2	120	48	9	9½	4,500	132	12	39
4	Danish Island	" 5	" 2	120	44	10	10	4,860	142	32	40
5	Golden Beauty	" 5	" 1	119	42	10	7	4,000	117	22	39
6	Gold Rain	" 5	Aug31	118	44	10	8	4,700	138	8	42
7	Improved American	" 5	Sept 2	120	44	10	8½	4,520	132	32	40½
8	Improved Ligowo	" 5	Aug31	118	50	9	8	4,340	127	22	41
9	Irish Victor	" 5	Sept 2	120	43	10	8	5,000	147	2	40
10	Pioneer (black)	" 5	" 4	122	40	10	8¾	3,980	117	2	37
11	Siberian	" 5	Aug25	112	47	9	9	4,320	127	2	39
12	Swedish Select	" 5	" 21	108	46	9	8½	4,046	119	14	40
13	Thousand Dollar	" 5	" 30	117	46	10	8	4,000	117	22	40
14	Twentieth Century	" 5	Sept 1	119	48	10	9	3,484	102	16	40
15	Victory	" 5	" 4	123	49	9	8¾	4,600	135	10	40
16	Banner (treated, formalin)	" 5	" 2	121	48	9	9	4,560	134	4	39
17	Banner (untreated)	" 5	" 2	121	48	9	9	4,940	145	10	39½

OATS IN FIELD LOTS.

Four varieties of oats were sown on summer-fallow and stubble land. Four bushels of Regenerated Abundance and two bushels of the other sorts were sown per acre.

Improved Ligowo was sown on the 3rd, Dodds' White on the 4th, Abundance on the 5th and 6th and Banner on the 9th of May.

All varieties were heavy in straw, badly lodged and late in ripening.

OATS—FIELD LOTS—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Average length of Straw, including Head.	Strength of Straw on a Scale of 10 Points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per Measured Bushel after Cleaning.
					In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Abundance (fallow)	May 6	Aug. 30	116	60	5	8¼	3,301	97	3	43·2
2	Banner (stubble)	" 10	" 30	112	46	8	6	1,997	58	25	38
3	Banner (fallow)	" 8	Sept. 4	119	54	7	7	3,163	93	1	39·2
4	Banner (stubble)	" 10	" 2	115	48	8	8	1,760	51	26	40·5
5	Improved Ligowo (fallow)	" 3	Aug. 30	119	58	8	8¼	2,720	80	..	40·8
6	Dodds White (fallow)	" 4	" 28	116	60	10	8	1,852	54	16	43·5

OATS—Average and Total Yields.

Variety.	Cultivation.	Acres.	Yield per Acre.		Total Yield.	
			Bush.	Lbs.	Bush.	Lbs.
Abundance	Fallow	16·54	97	3	1,608	..
Banner	Spring ploughing	5·06	58	25	331	..
Banner	Fallow	9·51	93	1	891	12
Banner	Spring ploughing	5·06	51	26	291	28
Improved Ligowo	Fallow	10·02	80	..	816	04
Dodds White	"	·50	54	16	27	08
		46·69	..	..	3,965	18

Average yield per acre: 84 bushels, 31 pounds.

EXPERIMENTS WITH BARLEY.

The barley tests both in uniform plots and field lots were very satisfactory. The yields in all varieties were good, but owing to the unfavourable weather during harvest the quality was somewhat impaired.

BARLEY—TEST OF VARIETIES.

Eleven varieties of six-row and eight varieties of two-row barley were sown on the 26th and 27th of April, at the rate of two bushels of seed per acre on plots of one-twentieth acre each. The land was rye grass sod broken and backset the previous year.

BARLEY—SIX-ROW—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per measured bushel after Cleaning.
					In.		In.	Lbs.	Bu. Lbs.	Lbs.
1	Claude	April 26..	Aug. 13..	109	46	9	2⅜	3,920	81 32	52½
2	Mansfield	" 26..	" 9..	105	48	9	2¾	4,400	91 32	52
3	Manchurian	" 26..	" 13..	109	48	8	3½	4,380	91 12	49
4	Nugent	" 26..	" 11..	107	45	8	3	4,360	90 40	51½
5	O. A. C. No. 21	" 26..	" 11..	107	49	10	2½	4,200	87 24	50
6	Odessa	" 26..	" 11..	107	44	8	2	4,100	85 20	49
7	Oderbruch	" 26..	" 9..	105	40	10	2¼	3,740	77 44	52½
8	Stella	" 26..	" 11..	107	42	10	2½	4,120	85 40	49½
9	Trooper	" 26..	" 11..	107	46	10	3	3,760	78 16	51
10	Yale	" 26..	" 13 .	109	42	10	2½	3,820	79 28	51
11	Mensury	" 26..	" 11..	107	46	10	3	3,880	80 40	50
12	Mensury (treated with formalin)	" 26..	" 11..	107	44	10	2½	4,040	84 8	50
13	Mensury (untreated)	" 26..	" 14..	110	42	10	2¾	3,680	76 32	50½

BARLEY—TWO-ROW—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a Scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	Weight per measured bushel after Cleaning.
					In.		In.	Lbs.	Bu. Lbs.	Lbs.
1	Canadian Thorpe	April 27	Aug. 17	112	44	10	3½	3,600	75 ..	53
2	Clifford	" 27	" 11	107	44	10	4	3,340	69 28	52
3	Danish Chevalier	" 27	" 16	111	36	10	4	3,980	82 44	53½
4	Hannchen	" 27	" 16	111	34	9	3½	4,120	85 40	54
5	Invincible	" 27	" 19	113	45	10	3	3,560	74 8	52½
6	Jarvis	" 27	" 12	108	45	10	4½	2,960	61 32	51½
7	Standwell	" 27	" 21	115	48	10	3	3,504	73 36	53
8	Swedish Chevalier	" 27	" 21	115	44	8	3	3,360	70 ..	52½

BARLEY—FIELD LOTS—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
					In.		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Manchurian (backsetting)	May 3.	Aug. 18.	107	48	5	3½	3,826	79	34	51·5
2	Manchurian (summerfallow)	Apr. 29.	" 20.	113	46	5	3	3,408	71	..	50·5
3	Mensury (summerfallow)	May 1.	" 17.	108	40	6	2½	3,196	67	..	49·5
4	Canadian Thorpe (corn land)	Apr. 28	" 19.	113	43	7	3	3,456	72	..	53·5
5	Hannchen (summerfallow)	May 2.	" 28.	118	39	8	3	3,796	79	4	53
6	Brewers (summerfallow)	" 10.	Sept. 4.	117	42	5	3	3,720	77	24	....

BARLEY—Average and Total Yields.

Variety.	Cultivation.	Acres.	Yield per Acre.		Total Yield.	
			Bush.	Lbs.	Bush.	Lbs.
Manchurian	Backsetting	5·14	79	34	409	34
Manchurian	Fallow	5·20	71	..	368	24
Mensury	"	10·27	67	..	689	..
Canadian Thorpe	Corn land	3·26	72	..	235	19
Hannchen	Fallow	3 30	79	4	261	40
Brewers	"	1·21	77	24	94	05
		28·38			2,058	26

Average yield per acre, 72 bushels and 25 pounds.

PEAS—UNIFORM PLOTS.

Twelve varieties were sown on April 26 on fallowed land, in plots of one-twentieth acre each.

Arthur was well ripened before frost came and was not injured. All other sorts were greatly hurt.

PEAS—FIELD LOTS.

Two varieties were sown on April 27 on fallowed land. Owing to the cold, wet season the growth of straw was large and the crop was late in maturing but notwithstanding this the yield was the largest yet produced on the Farm. Arthur was not injured in quality or germination.

PEAS—Uniform Test Plots.

Name of Variety.	Character of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.
							Ins.	Ins.		Bush. Lbs.
Arthur	Clay loam.	1·20	April 26	Sept. 2	129	Strong..	57	2½	Large ..	39 ..
Black-eye Marrowfat	"	1·20	" 26	" 12	139	"	67	2¾	" ...	29 40
Chancellor	"	1·20	" 26	" 14	141	"	96	2¾	Small ..	37 20
Daniel O'Rourke	"	1·20	" 26	" 16	143	"	89	2	" ...	33 ..
English Grey	"	1·20	" 26	" 21	148	"	62	2½	Large ..	38 20
Golden Vine	"	1·20	" 26	" 15	142	"	70	2	Small ..	34 20
Gregory	"	1·20	" 26	" 23	150	"	62	3	Medium	43 20
Mackay	"	1·20	" 26	" 10	137	"	60	2½	Large ..	39 ..
Paragon	"	1·20	" 26	" 16	143	"	72	2½	Medium	37 ..
Picton	"	1·20	" 26	" 16	143	"	74	2¼	"	39 ..
Prince	"	1·20	" 26	" 19	146	"	84	2½	Small ..	38 20
Prussian Blue	"	1·20	" 26	" 21	148	"	68	2¼	Medium	37 20

PEAS—FIELD LOTS.

Name of Variety.	Character of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.	Weight per Bushel.
							Ins.	Ins.		Bush. Lbs.	Lbs.
Arthur	Clay loam.	3·98	April 27	Sept. 2	128	Strong..	86	2½	Large	52 48	65
Golden Vine	"	4·70	"	" 8	134	"	90	2	Small	62 10	63

FALL WHEAT.

Two varieties of fall wheat were sown in the fall of 1910, Alberta Red on September 1, and Azima on the same date.

Both sorts were more than half killed by spring frosts. The grain from the remainder was inferior.

The yield per acre for Alberta Red was 22 bushels and 11 lbs.; the yield for Azima was 20 bushels and 32 lbs. per acre.

FALL RYE.

Fall rye was sown on the 1st of September, 1910, and as usual gave a good yield, 32 bushels and 1 lb. per acre. For early pasture nothing can surpass fall rye.

TARES AND HAIRY VETCH.

Common black tares gave a yield of 2 tons per acre, but seed did not ripen on account of frost.

Hairy vetch gave the same yield as tares but were only in blossom when frost came, and are not early enough for this country.

CANARY GRASS.

One-twentieth acre of this grass were sown, giving one and one-half tons of feed per acre.

FLAX.

The following varieties of flax were sown on fallowed land on 18th May and gave a very heavy crop of straw.

The varieties were stored in the barn and not threshed before the fire, and were destroyed.

La Plate, Russian, Common, White Flowering and Dutch. All but the former ripened before frost came.

Four seedings of Common flax were made on plots one-twentieth of an acre each, to determine the results of seeding on different dates.

The first seeding was made on May 5, 2nd on May 10, 3rd on May 20, and the 4th on May 30. The results of this experiment will be found below.

FLAX—DIFFERENT DATES OF SEEDING.

Variety.	Size of Plot.	Date Sown.	Date Ripe.	Days Maturing.	Average length of Straw.	Character of Straw.	Weight of Straw per acre.	Yield per Acre.	
					In.		Tons. Lbs	Bus.	Lbs.
Common Flax	1·20	May, 5	Aug. 30	117	27	Strong	1,840	34	36
" "	1·20	" 10	Sept. 1	114	30	"	1 420	33	52
" "	1·20	" 20	" 6	109	30	"	1 1,580	30	20
" "	1·20	" 30	" 20	213	30	"	1 1,672	28	32

FLAX—SOWN ON SPRING BREAKING.

Variety.	Size of Field.	Date Sown.	Date Ripe.	Days Maturing.	Average length of Straw.	Character of Straw.	Yield per Acre.	
	Acres.				Inches.		Bus.	Lbs.
Common Flax	2	May, 15	Aug., 30	107	25	Strong	16	23

SUMMARY OF CROPS—1911.

Wheat.

	Bus.	Lbs.
5 Varieties in field lots, 51·31 acres	1,841	44
4 Rotation plots, 22·26 acres	1,044	01
21 Uniform test plots	42	13
Cultural Experiment plots	224	
	3,151	58

Oats.

4 Varieties in field lots 36·57 acres	3,342	24
2 Rotation test plots 10·12 acres	622	28
17 Uniform test plots	109	14
Cultural Experiment plots	190	
	4,264	32

Barley.

4 Varieties in field plots, 18·04 acres	1,280	16
2 Rotation test plots 10·34 acres	778	10
21 Uniform test plots	54	21
Cultural Experimental plots	19	
	2,131	47

Peas.

2 Varieties in field lots 8·68 acres	432	31
12 Uniform test plots	22	15
	454	46
Fall Rye	18	50
Flax	48	21
Fall Wheat	5	06
Potatoes	260	
Roots	2,500	
		Tons.
Corn ensilage		125

Hay.

Western Rye Grass	25
Western Rye Grass and Red Clover	12
Alfalfa	24
Cut in coulees	12

ROTATIONS.

The following rotations are now under way: 'C,' 'P' and 'R.' Land has also been prepared and two new rotations, 'A' and 'J,' will be commenced in 1912.

ROTATION, 'A.'

A field of three acres which was formerly in brome grass pasture has been broken and backset, and will be put in wheat continuously.

ROTATION, 'J.'

A field of 30 acres has been prepared in a similar manner, laid out in six equal divisions and will be put under the following rotation, 1st year Summer-fallow, 2nd year Wheat, 3rd year Wheat, 4th year Oats, seeded to Rye-Grass, Red Clover and Alfalfa, 5th year Hay, 6th year Pasture.

ROTATION 'C.'

Commenced in 1911, Duration, Eight Years.

Description of Rotation: 1st year, Summer-fallow, 2nd year, Wheat, 3rd year, Wheat. Size of Plots, 6¼ acres.

Number of Plot.	Variety.	Preparation of Soil.	Date Sown.	Date Ripe.	Days Maturing.	Length of Straw including Head.	Strength of Straw.	Length of Head.	Yield per Acre.	
									Bus.	Lbs.
1	(Fallow).....	Barley stubble...	.....	.....	.....	.....	.....	.....	.....	.....
2	Red Fife.....	" " ...	April, 25	Sept. 2	130	40	10	2½	26	7
3	Red Fife.....	Oat stubble.....	" 25	Aug. 31	128	41	10	2½	33	..

ROTATION 'P.'

Commenced in 1910, Duration Nine Years.

Description of Rotation:—1st year Summer fallow, 2nd year Wheat, 3rd year Wheat, 4th year Summer fallow, 5th year Roots, 6th year Barley, seeded to a mixture of Rye Grass, Red Clover and Alfalfa, 7th year Hay, 8th year Pasture. Plots, 6 acres each.

Plot No.	Variety.	Preparation of Soil.	Date Sown.	Date Ripe.	Days Maturing.	Length of Straw including Head.	Strength of Straw.	Length of Head.	Yield per Acre.	
						In.			Bush.	Lbs.
1	(Fallow).....	Breaking....	.....	.....	.....	.....	.....	.....	.....	.....
2	Red Fife.....	Backsetting.	April 18	Sept. 2	137	46	10	3	48	10
3	Red Fife.....	"	" 18	" 2	137	46	10	3	48	10
4	(Fallow)	Breaking....	.....	.....	.....	.....	.....	.....	.....	.....
									Tons	Lbs.
5	Fodder Corn.....	"	May 22	.....	.....	.....	.....	.....	18	300
									Bush.	Lbs.
6	Barley S. D	"	" 3	Aug. 18	107	48	5	3½	79	34
7	Grass seed..	"	.....	.....	.....	.....	.....	.....	.....	.....
8	Grass seed..	"	.....	.....	.....	.....	.....	.....	.....	.....

ROTATION 'R.'

Commenced in 1910, Duration Nine Years.

Description of Rotation:—1st year Summer fallow, 2nd year Roots or Corn, 3rd year Wheat, 4th year Oats, 5th year Summer fallow, 6th year Wheat, 7th year Oats, seeded down with a mixture of Western Rye Grass, Red Clover and Alfalfa, 8th year Hay, 9th year Pasture. Plots, 5½ acres each.

Plot No.	Variety.	Preparation of Soil.	Date Sown.	Date Ripe.	Days Maturing.	Length of Straw including Head.	Strength of Straw.	Length of Head.	Yield per Acre.
									Tons Lbs.
1	Turnips / Fodder Corn	Fallow	May 22 / " 22						35 100 / 24 1,425
									Bush. Lbs.
2	Red Fife	Hoed crop	April 24	Aug. 30	128	48	10	3	41 37
3	Banner Oats	Wheat stubble	May 10	" 30	112	46	8	8	58 25
4	Fallow	Oat stubble							
5	Red Fife	Fallow	April 24	Sept. 4	133	50	10	3	43 28
6	Banner Oats, S.D.	Wheat stubble	May 10	" 2	115	48	8	8	51 26
7	Hay	Oat stubble							¾ tons.
8	Pasture	Hay							9 cattle 4½ m.
9	Fallow	Pasture							

CULTURAL INVESTIGATION WORK.

An extensive set of experiments to determine the best methods of carrying on the various cultural operations was started last year. A field of twenty-one acres was devoted to the work and some 478 one-fortieth of an acre plots were laid out and permanently marked off, a picket being placed at each corner of each plot. Four-foot interspaces were left between the plots and sixteen-foot roads were arranged between the ranges of plots, with cross roads at convenient places.

The twelve following experiments were started upon this land:

An experiment, occupying 46 plots, to determine the proper depth to plough summer-fallow, stubble and sod to get the most profitable returns in the succeeding crop.

An experiment, occupying 51 plots, to determine the best method of treating a summer-fallow.

An experiment, occupying 39 plots, to determine the best method of preparing stubble land for a succeeding crop.

An experiment, occupying 55 plots, to find out the most satisfactory method of seeding down to grass and clover.

An experiment, occupying 40 plots, to ascertain the best method of breaking sod from cultivated grasses.

An experiment, occupying 108 plots, to determine the best method of applying barnyard manure to secure the best results with corn, wheat, barley and oats.

An experiment, occupying 18 plots, to determine the value of green manuring and the most satisfactory crop to use for that purpose.

An experiment, occupying 9 plots, to determine the importance of seed bed preparation.

An experiment, occupying 75 plots, to determine the relative merits of surface, sub-surface and combination soil packers, and also the best time to use these implements.

An experiment, occupying 12 plots, to determine the best depth to sow wheat and oats.

An experiment, occupying 16 plots, to ascertain the effect of applying commercial fertilizers.

An experiment, occupying 9 plots, to ascertain the effect of under drainage.

These experiments were all gotten under way last spring, the plots being sown with Marquis wheat, Banner oats, Mensury barley, or North-Western Dent corn or else summer-fallowed, as the plan of the experiments required. Throughout the season accurate records were kept of all cultural operations, date of seeding, ripening, cutting, threshing, yield, etc., for each plot. Meteorological records were also kept week by week. Notes were taken on the condition of the soil and weather at the time of seeding, and on all influences affecting germination, growth, development and ripening of the crop, harvesting, etc.

As all the land had received the same treatment the previous season, little difference in the results from the various plots could be expected this year, but it is hoped that in a few years some very valuable information may be gleaned from this work. Growth on the entire field was rank, and most of the wheat was injured by frost, while all of the oat plots were lodged. The wheat gave an average yield of 45 bushels per acre; the oats 114 bushels per acre, and the barley 76 bushels per acre. The corn gave an average yield of nine and one-quarter tons per acre.

In the experiment with soil packers, where some difference in the results from the different plots might have been expected, the dull, damp weather in July and August so retarded ripening that all of the plots were quite immature when the frost came and consequently no definite conclusions could be drawn.

The plots were all prepared in the fall and everything is in readiness to continue the work this spring.

Mr. W. W. Thomson, B.S.A., who was appointed Assistant Superintendent in April, 1911, had charge of the Cultural Investigation work, and carried it on in a most satisfactory and creditable manner.

CLOVER AND GRASS TESTS.

The plots of alfalfa sown in 1904 and 1905 show considerable decrease under plots sown in 1908 and 1909.

The season was very unfavourable for curing the crops, but by putting in small heaps soon after cutting and turning during warm weather, the result was satisfactory.

I repeat remarks in previous report respecting cultivation, seeding, cutting and curing of alfalfa.

CULTIVATION, SEEDING AND HARVESTING OF ALFALFA.

Alfalfa can be sown on fallowed land or on stubble land.

Fallow.—If fallow lands drift with the winds, plough four inches deep before seeding to overcome the danger.

Stubble.—If stubble is heavy burn in the spring, plough five inches deep and harrow. If the land was ploughed the preceding fall, cultivate before sowing.

Seeding.—Sow twelve pounds of seed per acre, from May 25th to 31st. After seeding cross-harrow twice, then roll or pack soil; do not roll fallowed land, use packer instead.

Nurse crop.—On fallowed land grain can be sown; oats or barley is better than wheat, as these can be delayed in seeding. Alfalfa seed should not be sown too early. On stubble land, no nurse crop should be sown, as usually the moisture is not sufficient for both and the tender clover plants die. When clover is up about five inches mow close to the ground, and repeat the first week in August.

Leave the last growth uncut for winter protection. The mowing kills weeds and strengthens the roots, which is important the first winter.

Harvesting.—Alfalfa is usually ready for the first cutting early in July, and for the second cutting the same time in August of the second year. Cut when in blossom. Cut early in the forenoon, and if the day is fine, rake into windrows in the afternoon, and put into small cocks the next day. Allow the hay to cure in the cocks; turning and exposing to the air will hasten drying. Have the hay well dried before stacking, for fear of spoiling.

ALFALFA, SOWN 1904.

Variety.	Remarks.	First cutting July 4.		Second cutting August 18.	
		Tons.	Lbs.	Tons.	Lbs.
Common alfalfa	Strong....	1	740	..	1,120
Turkestan	"	..	1,730	..	1,300

ALFALFA, SOWN 1905.

Variety.	Remarks.	First cutting July 4.		Second cutting August 18.	
		Tons.	Lbs.	Tons.	Lbs.
Grimm	Strong....	1	1,880	1	280
New York	"	1	1,920	..	1,580
Samarkand (Turkestan)	"	1	940	..	1,620
Nebraska	"	1	620	..	1,020

ALFALFA, SOWN 1908.

Variety.	Remarks.	First cutting July 3.		Second cutting August 19.	
		Tons.	Lbs.	Tons.	Lbs.
Grimm (Lyman Co.)	Strong....	1	1,690	1	205
Idaho	"	2	410	1	745
Montana (Lyman Co.)	"	2	230	1	835
Dryland (Lyman Co.)	"	2	230	1	700
French alfalfa	"	2	680	1	1,240
Turkestan (Lyman Co.)	"	2	560	1	1,060

Alfalfa, Sown 1910.

Variety.	Remarks.	First cutting July 8.		Second cutting August 18.	
		Tons.	Lbs.	Tons.	Lbs.
Grimm	Strong	1	1,970	..	1,920
Turkestan	"	1	980	..	1,680

Alfalfa, Sown 1909.

Variety.	Remarks.	First cutting. July 3rd.		Second cutting. August 19th.	
		Tons.	Lbs.	Tons.	Lbs.
Canadian	Strong	4	721	1	907
Vilmorin's Sand Lucern	"	3	616	2	267
Lecoq's	"	4	332	1	1,879
Mongolian	"	3	616	1	907
Nephi Utah (dry land)	"	3	202	1	1,879
Sextorp, Neb	"	3	202	1	907
Alt-Deutsche Frankische	Medium	1	1,296	1	907
Provence-Aubignan	Strong	3	202	2	845
Wessel, Duval Peruvian	Medium	1	907	1	907
Baltic	Strong	3	1,004	2	1,233
Werney, Turkestan	Medium	1	1,296	2	1,233
Sand Lucerne (Darmstadt)	Strong	2	1,233	2	1,814
Chinook, Montana	"	3	202	1	1,296
Liefman's Sand Lucerne	"	2	651	2	845
Arabian	Killed out	..	....	..	....
Medicago, ruthenica	" "	..	....	..	....
Medicago, falcata	Strong	4	720	made no growth.	
Sand Lucerne, Bromberg	"	3	422	2	651
Thuringian Erfurt	"	2	1,814	2	651
Sand Lucerne, Wissinger	Medium	1	1,879	2	73
Hungarian, Boschan	Strong	2	845	1	1,879
Pfalzer (Bavarian)	"	2	1,819	3	202
Frasinet (Roumanian)	"	2	1,814	2	1,233
Vasluiu	"	3	422	2	1,233
Belfontaine (Ohio)	"	3	616	2	845
Mixed seed	"	2	1,427	3	202
Old Frankish Lucerne	"	2	1,330	1	1,308
W. A. Wheeler, No. 162	"	1	1,240	1	205
No. 240	"	1	1,735	1	565
No. 164	"	1	1,060	1	115
No. 167	"	1	1,780	1	250
Grimm (A. B. Lyman Co.)	"	1	1,690	..	1,935
Montana (23454)	"	1	340	..	1,998
No. 25102	"	1	1,240	1	205
Sand Lucerne (23394)	"	1	430	1	295
Canadian, Variegated	"	1	1,240	1	322
" Purple flowers	"	1	790	1	43
Turkestan	"	1	880	1	160
Turkestan (sown 1910)	"	1	1,420	.	1,503
Grimm	"	1	700	1	25
Turkestan	Kept for seed none matured				

GRASSES AND RED CLOVER.

Variety.	Year Sown.	First cutting July 4th		Second cutting August 18th.	
		Tons.	Lbs.	Tons.	Lbs.
Rye Grass, Red Clover and Timothy	1907	1	880	..	960
Brome Grass	1899	1	1,320	..	1,340
Western Rye Grass and Red Clover	1904	1	340	..	704
Red Top	1908	1	1,480	..	1,610
English Blue Grass	1908	1	440	..	1,200
Red Clover	1910	2	460	.....	

CORN AND ROOT CROPS.

The land for these crops was summer-fallowed the previous year, being ploughed early in June about eight inches deep.

During the growing season it was cultivated several times, and before frost set in manure was applied and ploughed in. In the spring a cultivation was given before the corn and roots were sown.

EXPERIMENTS WITH INDIAN CORN.

Nine varieties of Indian corn were sown on May 22 in rows 35 inches apart, an ordinary hoe grain drill being used.

Frost overtook the crop before the ears were well formed and it was cut and put in the silo, from the 12th to the 17th of September.

The land was summer-fallowed in 1910 and 12 tons of well rotted manure applied in November and ploughed in.

INDIAN CORN FOR ENSILAGE—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Cutting.	Average Height.	Condition when Cut.	Weight per acre grown in Rows.	
				Ins.		Tons.	Lbs.
1	Angel of Midnight	May 22.	Sept. 12	90	Early milk....	26	580
2	Champion White Pearl	" 22.	" 12	94	"	17	1,200
3	Compton's Early	" 22.	" 12	85	Silk.....	25	1,260
4	Patterson	" 22.	" 12	62	Late milk.....	17	1,310
5	Eureka	" 22.	" 12	84	Early milk....	20	1,250
6	Longfellow	" 22.	" 12	102	"	24	400
7	North-Western Dent	" 22.	" 12	72	"	18	300
8	Selected Leaming	" 22.	" 12	78	"	18	1,840
9	Superior Fodder	" 22.	" 12	84	In tassel.....	19	60

FIELD ROOTS.

Turnips, mangels, sugar beets and carrots were sown on fallowed land. Frequent cultivation was given during the season and the crop was very satisfactory both in yield and quality.

Turnips—Test of Varieties.

Name of Variety.	Character of Soil.	Size of Plot.	Character of Growth.	1st plot—Sown.	1st Plot—Pulled.	Yield per Acre. — 1st Plot. Tons.	Yield per Acre. — 1st Plot. Lbs.	Yield per Acre. — 1st Plot. Bush.	Yield per Acre. — 1st Plot. Lbs.	Description of Variety.
Hall's Westbury	Clay loam	1/132	Strong.	May, 22	Oct. 7	39	1,068	1,317	48	Large, very fine.
Jumbo	" "	1/132	" .	" 22	" 7	39	672	1,311	12	" "
Magnum Bonum	" "	1/132	" .	" 22	" 7	35	1,676	1,194	36	" good.
Mammoth Clyde	" "	1/132	" .	" 22	" 7	35	1,544	1,192	24	" "
Perfection Swede	" "	1/132	" .	" 22	" 7	35	1,412	1,190	12	" "
Hartley's Bronze	" "	1/132	" .	" 22	" 7	33	1,716	1,128	36	" "
Good Luck	" "	1/132	" .	" 22	" 7	33	1,716	1,128	36	Medium "
Halewood's Bronze Top	" "	1/132	" .	" 22	" 7	32	152	1,069	12	" "
Carter's Elephant	" "	1/132	" .	" 22	" 7	27	1,868	931	8	" "
Bangholm Selected	" "	1/132	" .	" 22	" 7	26	1,196	886	36	" "

Mangels—Test of Varieties.

Name of Variety.	Character of soil.	Size of plot.	Character of growth.	1st plot—Sown.	1st plot—Pulled.	Yield per Acre. — 1st Plot. Tons.	Yield per Acre. — 1st Plot. Lbs.	Yield per Acre. — 1st Plot. Bush.	Yield per Acre. — 1st Plot. Lbs.	Description of Variety.
Selected Yellow Globe	Clay loam	1/132	Strong.	May, 22	Oct. 6	34	1,696	1,161	36	Large and smooth
Half Sugar White	" "	1/132	" .	" 22	" 6	34	144	1,135	12	" "
Yellow Intermediate	" "	1/132	" .	" 22	" 6	31	1,360	1,056	..	" "
Perfection Mam. Long Red	" "	1/132	" .	" 22	" 6	30	1,996	1,051	36	" "
Giant Yellow Globe	" "	1/132	" .	" 22	" 6	30	1,908	1,031	48	" very fine.
Prize, Mam. Long Red	" "	1/132	" .	" 22	" 6	30	588	1,009	48	Medium size, rooty.
Giant Yellow Intermediate	" "	1/132	"	" 22	" 6	29	202	970	12	Medium size, smooth.
Gate Post	" "	1/132	"	" 22	" 1	26	1,988	899	48	Small size very rooty.

Sugar Beets—Test of Varieties.

French Very Rich	Clay loam	1/132	Strong.	May, 30	Oct. 7	21	1,956	732	36	Good size smooth.
Klein Wanzleben	" "	1/132	" .	" 30	" 7	14	248	470	48	Medium size, smooth.
Vilmorin's Improved	" "	1/132	" .	" 10	" 7	11	1,232	387	12	Small, rooty.

Carrots—Test of Varieties.

Ontario Champion	Clay loam	1/132	Strong.	May, 22	Oct. 7	22	616	743	30	Large, smooth.
Improved Short White	" "	1/132	"	" 22	" 7	21	636	7..	36	" "
Mam. White Intermediate	" "	1/132	"	" 22	" 7	20	524	607	32	" "
White Belgian	" "	1/132	"	" 22	" 7	17	1,112	585	12	Medium, "
Half Long Chantenay	" "	1/132	"	" 22	" 7	16	1,528	558	48	" "

EXPERIMENTS WITH POTATOES.

Seventeen varieties of potatoes were planted on the 18th of May in drills thirty inches apart, and twelve to fourteen inches apart in the drills. After the crop was up the ground was harrowed and frequent cultivation given during the season.

The potatoes were taken up on the 29th and 30th of September and were without exception the best ever grown on the Experimental Farm.

American Wonder, which is usually near the top of the list in yield, was this year the second lowest, caused by being rather close to trees.

POTATOES—Test of Varieties.

No.	Variety.	Character of Soil.	Date Planted.	Date Lifted.	Growth.	Size.	Yield per Acre. Bush.	Yield per Acre. Lbs.	Form and Colour.
1	American Wonder..	Clay Loam.	May, 18	Sept, 29	Medium.	Large.	367	24	Long, White.
2	Ashleaf Kidney.....	" "	" 18	" 29	Strong.	"	694	40	Round, White.
3	Late Puritan.....	" "	" 18	" 29	"	"	772	12	Oval, White.
4	Carman No. 1.....	" "	" 18	" 29	"	"	640	12	" "
5	Empire State.....	" "	" 18	" 29	"	"	697	24	Round, White.
6	Vicks Extra Early..	" "	" 18	" 29	"	"	690	48	Oval, Pink.
7	Dalmeny Beauty....	" "	" 18	" 29	"	"	655	36	" White.
8	Morgan Seedling...	" "	" 18	" 29	"	"	719	24	Long, Pink.
9	Money Maker	" "	" 18	" 29	"	"	567	36	Long, White.
10	Reeves' Rose.....	" "	" 18	" 29	"	"	574	12	Oval, Red.
11	Rochester Rose.....	" "	" 18	" 29	"	"	761	12	" "
12	Everett.....	" "	" 18	" 29	"	"	732	12	Long, Pink.
13	Factor	" "	" 18	" 29	"	"	521	24	Oval, White.
14	Gold Coin.....	" "	" 18	" 29	"	"	810	..	" "
15	Irish Cobbler..	" "	" 18	" 29	"	"	809	45	Long, Pink.
16	Dreer's Standard....	" "	" 18	" 29	"	"	717	12	Oval, White.
17	Hard to Beat.....	" "	" 18	" 29	"	"	314	36	" "

VEGETABLE TESTS.

Excepting vegetables such as cabbage, cauliflower, beets, celery, carrots and onions, the season was not favourable, and the results were not satisfactory.

The weather was cold and wet when tomatoes, cucumbers, squash, melons, etc., were in blossom, causing very little fruit to set.

Frost in August overtook peas, beans, corn, etc., before they had ripened.

Asparagus.—A good crop was obtained from the old beds of Barr's Mammoth, Barr's Elmira and Conover's Colossal. In use from May 13 to July 10.

Beans.—Sown in garden May 18, destroyed by frost before maturing.

Variety.	Seed from.	In Use.	Pulled.	Remarks.
Kenney's Rustless Wax.....	Thorburn.	July 26	Sept. 8	Frozen.
Wardell's Kidney Wax.....	"	" 29	" 8	"
Valentine.....	"	" 29	" 8	"
Early Refugee.....	"	" 24	" 8	"
Challenge Black Wax.....	"	" 26	" 8	"
Stringless Green Pod....	Burpee.	" 26	" 8	"
Refugee or Thousand to One.....	Henderson....	Aug. 20	" 8	"
Hodson Wax	Ont. Seed Co..	" 15	" 8	"
Davis White Wax.....	" ..	July 29	" 8	"
Flageolet or Giant Wax... ..	" ..	" 26	" 8	"
Wardell's Kidney Wax....	" ..	" 26	" 8	"
Red Valentine..	" ..	" 26	" 8	"
Refugee or Thousand to One....	" ..	Aug. 18	" 8	"

Beets.—Sown May 3, pulled September 28.

Variety	In use.	Yield per Acre.	
		Bush.	Lbs.
Meteor	July 28	1,060	..
Ruby Dulcet	" 28	773	20
Black Red Ball	Aug. 1	406	..
Early Blood Red Turnip	" 1	773	20
Egyptian Dark Red Turnip	" 4	812	..
Eclipse	July 26	541	20
Egyptian Dark Red	" 26	522	..

Cabbage.—Sown in hot-house March 23, set out in garden May 18, taken up September 28.

Variety.	In Use.	Average Weight.	Remarks.
		Lbs.	
Lubeck	July 28	10	Medium, solid.
Madgeburg	Aug. 24	12	Large "
Small Erfurt	" 1	10	Medium "
Winningstadt	" 24	10	" "
Danish Ball Head	" 28	13	Large "
Extra Dark Red Dutch (red)	Sept. 25	4	Small "
Danish Delicatesse (red)	" 25	4	" "
Red Danish Stone Head (red)	" 25	3	" "
Danish Summer Baldhead	Aug. 24	8	Medium "
Flat Swedish	July 29	20	Extra large, solid.
Improved Amager Danish Roundhead	Aug. 24	8	Small "
Extra Amager Danish Ballhead	" 27	12	Large "
Copenhagen Market	July 29	19	Extra large, solid.

Cabbage.—Sown in hot-house March 29, set out in garden May 23, taken up September 28.

Variety.	In Use.	Average Weight.	Remarks.
		Lbs.	
Early Jersey Wakefield	July 29	10	Medium, solid.
Early Paris Market	" 29	9	Small "
Fottler's Improved Drumhead	" 30	10	Medium "
Large Flat Drumhead	Aug. 24	11	" "
Extra Early Midsummer Savoy	" 1	11	" "

Cauliflower.—Sown in hot-house March 23, set out in garden May 18.

Variety.	In use.	Average Weight.	Remarks.
Danish Giant	July 29	8 lbs.	Good.
Early Snowball	" 10	7 "	"
Extra Early Selected Erfurt Dwarf	" 15	6¼ "	"

Celery.—Planted June 10 in trenches 18 inches deep, 9 inches of manure in bottom of trench and 6 inches of soil on top of the manure. The celery was given several good waterings during the season.

Variety.	Sown in Hot-house.	Set out.	In use.	Weight per dozen Heads.
Paris Golden Yellow	Mar. 29	June 10	Oct. 10	25 lbs.
Giant Pascal	" 29	" 10	" 10	20 "
Rose Ribbed	" 29	" 10	" 10	24 "
French Success	" 23	" 10	Sept. 25	28 "
Nollts' Magnificent	" 23	" 10	" 25	26 "
Evans' Triumph	" 23	" 10	" 25	29 "
White Plume	" 27	" 10	" 11	14 "

Carrots.—Sown April 26, pulled September 28.

Variety.	In use.	Yield per Acre.		Remarks.
		Bush.	Lbs.	
French Horn	July 21	464	..	Good crop.
Improved Nantes	" 21	290	..	Medium crop.
Oxheart	" 21	425	20	Good crop.
Chantenay	" 21	251	20	Medium crop.

Cucumbers.—Sown in hot-house March 23, set out in garden May 31.

Variety.	In Use.	Ripe.	Length.	Remarks.
			In.	
Chicago Pickling	Aug. 16		6	Poor crop.
Improved White Spine				None.
Early Short Green	Aug. 16		5	Poor crop.
Peerless, or Improved, White Spine				None.

Egg Plant.—Sown in hot-house March 23, set out in garden June 6, some fruit formed but did not mature.

TABLE CORN—Sown May 20.

Variety.	In Use Green.	Remarks.
Malakoff	Aug. 29	Did not mature for seed.
Fordhook Early	" 29	" "
Golden Bantam	Sept. 14	" "
Early Evergreen	" 9	" "
Henderson's Metropolitan	" 9	" "
Devitt's Early Sugar	" 9	" "
White Squaw	Aug. 20	" "

Citrons.—Sown in hot-house April 6, set out in garden June 1, no fruit matured.

Musk Melon.—Sown in hot-house March 23, planted out in garden May 31, none matured.

Parsnips.—Sown in garden April 26, taken up October 20.

Variety.	In Use.	Bushels per Acre.	Remarks.
Hollow Crown	Sept. 13	696	Good crop.

Parsley.—Double curled, sown in hot-house March 23, transplanted in garden May 19, in use July 19, good crop.

Peppers.—Three varieties, Cayenne, Chili and Early Metropolitan were sown in hot-house March 23, transplanted in garden June 1; did not mature.

GARDEN PEAS—Sown in garden May 3.

Variety.	In Use.	Pulled.	Remarks.
Gregory's Surprise	July 28	Aug. 24	Poor crop.
Gradus	" 30	Sept. 6	Medium crop.
American Wonder	" 25	" 2	" "
McLean's Advancer	" 28	" 27	" "
Heroine	" 30	" 27	" "
Stratagem	Aug. 4	" 6	" "
Telephone	" 10	" 25	" "
Thos. Laxton	" 4	" 2	" "
Premium Gem	July 28	Aug. 10	Poor crop.
Nott's Perfection	Aug. 10	Sept. 27	Medium crop.
Sutton's Excelsior	" 10	Oct. 4	" "
Juno	" 20	" 4	" "

Only two varieties, Gregory's Surprise and Premium Gem matured, the others were injured by frost.

Radish.—First seeding in garden, April 27, second seeding June 6, first seeding in use May 9, second seeding in use July 4.

Variety.	Remarks, First Seeding.	Remarks, Second Seeding.
Forcing Turnip Scarlet	Good crop.	Good crop.
Early Scarlet White Tipped	" "	" "
Non Plus Ultra	" "	" "
Rosy Gem	" "	" "
White Scribe	" "	" "

Lettuce.—First seeding April 27, second seeding June 6, first seeding in use June 2, second seeding in use August 4.

Variety.	Remarks, First Seeding.	Remarks, Second Seeding.
Red Edged Victoria	Good heads.	Good heads.
Unrivalled Summer	" "	" "
Wheeler's Tom Thumb	" "	" "
Cos Trianon	" "	" "
All Heart	Med. heads.	Fair size.
Grand Rapids	Good heads.	Good heads.
Giant Crystal Head	" "	" "
Black Seeded Simpson	" "	" "
Crisp as Ice	Extra large.	" "
Iceberg	" "	" "
Hanson	Good heads.	" "
May King	" "	" "

ONIONS—Sown in garden April 26, taken up September 25.

Variety.	Bushels Per Acre.	Remarks.
Large Red Wethersfield	309 20	Good crop.
Southport Red Globe	309 20	"
Yellow Globe Danvers	290 ..	"
Johnson's Dark Red Beauty	192 20	Medium crop.
Danver's Yellow Globe	188 31	"
Salzer's Wethersfield	145 6	"

SQUASH.

Variety.	Sown in Hothouse.	Set out in Garden.	In use.	Pulled.	Remarks.
Summer Crookneck	March 23...	May 31....	.....	.....	Did not mature.
Delicata	" 23...	June 1....	.....	.....	" "
Custard Marrow Scallop	" 29...	" 1....	.....	.....	" "
Long White Bush Marrow	" 29...	May 31....	August 1..	Sept. 6....	Poor crop.
Long Vegetable Marrow	" 29...	" 31....	" 10..	" 6.....	"
White Congo	" 29 ..	June 1....	.....	.....	Not matured.
Mammoth Whale	" 29...	May 31....	Sept. 1.....	.....	Poor crop.
Hubbard	" 29...	" 31....	.....	.....	Not matured.

Tomatoes.—Sown in hot-house April 4, set out in garden May 31.

Variety.	First Ripe.	Weight from 5 Plants.	Remarks.
		Lbs.	
Chalk's Early Jewel	August 10	9¼	Poor crop.
Bonny Best	" 31	14¼	"
Rennie's XXX	" 27	10	"
Florida Special	" 27	9¾	"
Earliana	" 24	10½	"
First of All	" 27	6¼	"
Spark's Earliana	" 24	18	"

Water Melons.—Planted in hot-house March 23. Planted out in garden May 31. No fruit formed as fertilization was prevented by the dull, cold weather.

Musk Melons.—Sown in hot-house March 23. Set out in garden May 31. The growth was poor and no fruit formed.

Citron.—Sown in hot-house April 6. Planted in garden June 1. Growth was very small and no fruit formed.

Turnips.—Early White Flat Strapped, sown in garden May 19, ready for use July 28, taken up October 13. Yield per acre, 1,450 bushels.

Brussels Sprouts.—Sown in hot-house April 3. Planted in garden May 17. pulled October 20. Average weight per head 9 lbs.

Salsify.—Sown in garden May 19. Ready for use September 20, pulled October 13. Good crop. Variety, Long White.

Spinach.—Sown in garden May 19. Ready for use July 4. Good crop. Second seeding, June 6. Ready for use July 28. Good crop.

Rhubarb.—The old beds of rhubarb were in use from May 16 to September 23, giving a good crop.

Rhubarb seed was sown on June 11, to produce young plants for the following spring's distribution.

Part of the Shrubbery, Experimental Farm, Indian Head, Sask.

THE FLOWER GARDEN.

Both annual and perennial flowers gave a large quantity of bloom, the most interesting being a bed of pansies and a bed of sixteen varieties of hollyhocks.

ANNUALS:

Variety.	Sown in Hot-house.	Trans-planted.	In Bloom.	
			From.	To.
Asters (13 varieties)	April 4	May 29	July 7	Aug. 11.
Abronia umbellata		" 15	Aug. 2	Sept. 24.
Ageratum, Dwarf Imperial		" 15	" 1	" 28.
Antirrhinum, (6 varieties)	April 28	June 5	July 7	" 28.
Balsam, Camellia	" 4	May 30	June 28	Aug. 26.
Brachycome iberidifolia		" 15	Aug 3	Sept. 24.
Calendula		" 18	June 27	Oct. 25.
Candytuft	March 28	June 2	" 20	Sept. 29.
Clarkia		May 15	July 4	" 24.
Celosia		" 18	Aug. 11	Aug. 25.
Coreopsis picta		" 18	July 28	Sept. 24.
Dianthus, (7 varieties)		" 15	" 4	Oct. 20.
Eschscholtzia Californica			June 28	Sept. 6.
Gaillardia. (picta)		May 15	July 20	" 28.
Godetia rubicunda		" 15	Aug. 10	Oct. 20.
Helichrysum		" 15	" 10	Sept. 24.
Iberis		" 15	July 7	" 28.
Larkspur, (3 varieties)	March 24	April 19	" 4	Oct. 20.
Mignonette		May 15	" 4	" 20.
Nicotiana affinis		" 15	" 5	Sept. 24.
Nemesia		" 15	" 4	" 24.
Papaver Danebrog	March 24	April 29	No bloom	
Pansy. (8 varieties)	" 24	" 19	June 18	Oct. 23.
Petunia	" 24	May 30	" 18	Sept. 24.
Phlox, (4 varieties)	" 28	April 19	July 15	Oct. 27.
Poppy. (4 varieties)		May 15	Aug. 1	Sept. 9.
Portulaca		" 15	July 10	" 6.
Salpiglossis		" 15	Aug. 16	" 28.
Scabiosa, (3 varieties)		" 15	July 25	Oct. 20.
Sultan Sweet		" 15	" 11	Sept., 24.
Stocks, (2 varieties)	April 3	" 30	June 20	Oct. 4.
Tagetes patula		" 15	No bloom.	
Sweet Peas (24 varieties)		April 27	July 15	" 6.
Nasturtium (4 varieties)	April 27	May 30	" 4	Sept. 6.
Verbenas (3 varieties)	" 4	" 30	No bloom	
Zinnia	" 4	" 30	June 28	Aug. 26.
Lobelia		April 6	July 7	Sept. 28.

HOLLYHOCKS—(Biennials.)

Sixteen varieties of hollyhock were sown in the hot-house on March 25, and transplanted in the garden June 1, 1910. These bloomed this season from July 18 to October 4.

PERENNIALS.

Variety.	In Bloom.	
	From	To
Achillea Millefolium	June 19	Sept. 15.
Achillea Ptarmica	" 19	" 20.
Blue Squills	May 5	May 15.
Bleeding Heart	June 17	July 12.
Columbine	" 2	" 22.
Comfrey	" 17	" 25.
Clematis, Blue	" 30	Sept. 20.
Clematis, recta	" 19	Aug. 17.
Campanula	July 17	Sept. 24.
Centaurea, Yellow	Aug. 4	" 20.
Centaurea	July 28	" 10.
Everlasting	June 20	June 30.
German Iris	May 29	" 17.
Golden Glow	Aug. 24	Sept. 21.
Gladioli	July 18	" 20.
Helianthus	" 22	" 2.
Hemerocallis	" 17	Oct. 7.
Iris Sibirica	May 29	June 20.
Japanese Paeonies	June 19	July 25.
Larkspur	July 8	Aug. 4.
Lilies (several varieties)	June 24	" 17.
Lupinus Polyphyllus	" 19	July 25.
Lily of the Valley	No bloom.	
Oriental Poppy	June 20	" 4.
Paeonies (assorted varieties)	May 26	" 25.
Phlox (perennial)	July 23	Sept. 25.
Pyrethrum	June 20	Aug. 10.
Perennial Asters	No bloom.	
Sweet William	June 14	July 29.
Sidalcea, candida	July 18	Aug. 15.
Spiraea, Filipendula	June 24	July 24.
Shasta Daisy	July 4	Sept. 14.
African Daisy	" 4	" 25.
Tall Lychnis	June 10	Aug. 3.
Tall White Iris	" 8	June 24.
Veronica Spicata	" 19	Sept. 22.
Canterbury Bells	July 10	" 5.
Tulips (18 varieties)	May 6	June 10.
Dahlias (33 varieties)	No bloom.	
Cannas (13 varieties)	Aug. 23	Sept. 26.

FRUITS.

While all fruit trees and bushes were loaded down with blossoms, a cold, wet spell, with hail at time of bloom caused the fruit crop to be disappointing. This was especially the case with crab apples, plums and currants.

Twenty-six varieties of red currants, twelve varieties of white, and thirty-one of black are at present under test, also thirty varieties of gooseberries, fifteen of raspberries and blackberries, with one variety of strawberries.

Small Fruits.

The following varieties of small fruits are grown on the Farm at present:

Red Currants.

Benwell,
Cherry,
Cumberland Red,
Early Scarlet,
Fay's Prolific,
Fertile D'Angers,
Greeenfield,
Houghton Castle,
London Red,
Large Red,
La Conde,
Long Bunch Holland,
Manitoba Amber,
Moore's Early,
North Star,
New Red Dutch,
Prince Albert,
Red Grape,
Raby Castle,
Rankins' Red,
Red Jacket,
Simcoe King,
Victoria,
Victoria Red,
Versailles.

White Currants.

Climax,
Frauendorfer White,
Large White,
Large White Brandenburg,
Verrieres' White,
White Imperial,
White Dutch,
White Kaiser,
White Cherry,
White Pearl,
White Grape,
Wentworth Leviathan.

Black Currants.

Bang-Up,
Black English,
Beauty,
Black Grape,
Crandall's Missouri,
Clipper,
Climax,
Dominion,
Eclipse,
Ethel,
Eagle,
Gewohnliche,
Ismay's Prolific,
Kerry,
Lewis,
Lee's Prolific,
Mattie,
Merveille de la Gironde,
Magnus,
Ogden,
Ontario,
Oxford,
Perry,
Perth,
Stirling,
Stewart,
Star,
Standard,
Saunders,
Topsy,
Winona.

Raspberries.

Columbia,
Cuthbert,
Cardinal,
Dr. Reider,
Golden Queen,
Herbert,
King,
Marlboro,
Ruby Red,
Turner.

Black Raspberries.

Conrath,
Hilborn,
Mungers,
Older,
Palmer.

Gooseberries.

Companion,
Cluster,
Carrie,
Carman,
Cox's Late Green,
Downing,
Edna,
Governess,
Gibb,
Griffin,
Houghton's Seedling,
Industry,
Lady Houghton,
Mabel,
Merton,
Pale Red,
Ruth,
Rideau,
Red Jacket,
Ramsay,
Richland,
Smith's Improved,
Saunders,
Sussex,
Sandow,
Silvia,
Troy,
Vesta,
Weir,
York.

Strawberries.

Senator Dunlap.

Cross-Bred Apples.

When picking the crop of cross-bred apples, a record was kept of the weight of fruit gathered from some of the best trees, and is given below. The date of picking was September 22.

Orchard	Row.	No.	Name.	Year Planted.	Year Began Fruiting.	Weight of Fruit, 1911. Lbs.	Average Diameter.
IV	3	404	Cavan	1901	1904	44	1¼
IV	3	405	Cavan	1901	1904	32	1¼
IV	4	428	Aurora	1903	1907	45	1
IV	4	429	Aurora	1903	1907	49	1
IV	4	430	Aurora	1903	1907	37	1
IV	4	431	Aurora	1903	1907	31	1
IV	5	436	Charles	1903	1909	29	1½
IV	5	437	Charles	1903	1907	26	1½
IV	5	438	Charles	1903	1908	20	1½
IV	5	439	Charles	1903	1907	18	1½
IV	5	445	Derby	1903	1907	29	1
IV	5	451	Pioneer	1903	1907	27	1
IV	6	457	Progress	1903	1908	24	1
V	4	583	Prairie Gem	1904	1908	26	1¼
V	13	695	Sdlg. of Stork	1905	1908	10	1
VI	1	875	Northern Queen	1905	1908	12½	¾
VI	2	893	Pioneer	1905	1909	15	1
VI	3	904	Tony	1905	1908	38	1½
VI	3	911	Eve	1905	1909	8	1¼
III	1	228	Novelty	1902	1907	11	1
III	3	268	Prairie Gem	1902	1907	19	1
III	5	286	Aurora	1902	1905	38	1
III	6	306	Aurora	1902	1908	34	1

Seedling Plums.

Seventeen varieties of seedling plums, obtained from the Experimental Station at Brookings, S. Dakota, in 1908, came through the winter safely. Several of the varieties fruited to a small extent, producing some large-sized plums that ripened before frost came.

FRUIT TREES PLANTED IN 1911.

HYBRID APPLES OBTAINED FROM HELDERLEIGH NURSERIES, WINONA, ONT.

50 Alberta.
15 Magnus.
50 Silvia.
50 Jewel.
25 Pioneer.
25 Tony.

OBTAINED FROM THE PLEASANT VALLEY NURSERIES, WINONA, MINN., U.S.A.

10 Duchess.
10 Charlamoff.
10 Hibernal.
10 Patten's Greening.

TREES AND SHRUBS.

All varieties made a good growth, and unlike the previous year, frost did no harm in the spring, and all had a great deal of bloom. A list of the shrubs in bloom is given. The lilacs, 20 varieties, and mountain ash were conspicuous for their great profusion of flowers.

FLOWERING SHRUBS.

Variety.	In Bloom.	
	From.	To
Lilacs.		
Mons. Maxime Cornu	June, 6	July, 8.
Rubella Plena	" 6	" 12.
Condorcet	" 10	" 16.
La Tour d'Auvergne	" 6	" 10.
Mathieu de Dombasle	" 9	" 8.
De Marly	" 8	" 10.
President Grevy	" 6	" 8.
Lemoine	" 10	" 16.
Persian Lilac	" 13	" 4.
Madame Casimir Perrier	" 7	" 12.
Chas. Joly	" 6	" 5.
Francisque Morel	" 9	" 10.
Congo	" 7	" 10.
Mme. Legraye	" 8	" 12.
Abel Carrière	" 8	" 7.
Madame Lemoine	" 6	" 6.
Josikaea	" 12	" 18.
Charles X	" 8	" 9.
Michel Buchner	" 6	" 6.
Villosa	" 15	" 27.
Other varieties of shrubs.		
Golden Currant	" 9	" 21.
American Elder	" 10	" 19.
Saskatoon	May, 5	May, 13.
Hawthorn	" 12	" 19.
Caragana (6 varieties)	" 25	June, 12.
Dogwood (Cornus)	" 25	" 17.
High Bush Cranberry	June, 14	" 30.
Berberis	" 30	" 15.
Roses (single varieties)	" 4	Oct 12.
Mountain Ash	" 5	" 14.

PREPARING LAND FOR GRAIN-CROPS IN SASKATCHEWAN.

By Angus Mackay,

Superintendent of Experimental Farm, Indian Head, Sask.

During the growing season of 1908 almost the entire western portion of the province suffered from dry weather, and the majority of the new settlers, either from unfamiliarity with the methods of cultivation for the conservation of moisture, or through a desire to bring the greatest possible area under cultivation, naturally suffered a severe disappointment.

In some districts, where in former years moisture had been abundant and proper cultivation had in consequence been neglected in the effort to 'get rich quick,' the partial failure of the crop proved an expensive lesson.

For many years, commencing in 1888, the methods of conserving moisture by 'Breaking and Backsetting' and by 'Summer-fallowing,' now called 'Dry-farming' for a change, have been recommended and universally adopted by the older settlers, but to very many of the new settlers they are unknown. The latter, I trust, may be benefited by the following explanation of the methods, which, for a great many years, have proven uniformly successful at the Experimental Farm here, and may with confidence be recommended for every district in the Province of Saskatchewan.

BREAKING PRAIRIE SOD.

The success or failure of a new settler often depends on the method employed in the preparation of the land for his first crop, and it is therefore of the utmost importance that the question of 'Breaking' or 'Breaking and Backsetting' be given the consideration it deserves.

For some years past the general practice throughout the country has been to continue breaking three or more inches deep so long as the teams can turn over the sod, then in the fall to disc the top-soil and grow grain in the spring following. From the breaking so done before the end of June, a good crop of wheat, oats or barley is usually obtained but no amount of cultivation will ensure even a fair crop on this land in the next succeeding year. After the first crop has been cut, the soil is usually in a perfectly dry state and remains so, in spite of any known method of cultivation, until the rains come in the spring following. If they are insufficient or late, as is frequently the case, failure of the crop must be the result.

BREAKING AND BACKSETTING.

Breaking and backsetting is the true way of laying the foundation for future success in the greater number of districts throughout the province, and while this method does not permit of as large an acreage being brought under cultivation in the year, it does permit of more thorough work and ensures better results in the long run. The anxiety of nearly all settlers to sow every acre possible, regardless of how or when the work on the land has been accomplished, may be given as the reason for breaking and discing, to a large extent, superseding the older, better and safer plan.

Breaking and backsetting means the ploughing of the prairie sod as shallow as possible before the June or early July rains are over, and in August or September, when the soil will have become thoroughly rotted by the rains and hot sun, ploughing two or three inches deeper in the same direction and then harrowing to make a fine and firm seed bed. From land prepared in this way two good crops of wheat may be expected. The first crop will be heavy and the stubble, if cut high at harvest time, will retain sufficient snow to produce the moisture required, even in the driest spring, to germinate the seed for the next crop. The stubble-land can readily be burned on a day in the spring with a warm, steady wind and the seed may be sown with or with-

out further cultivation. In a case where the grass roots have not been entirely killed by the backsetting, a shallow cultivation before seeding will be found advantageous but as a rule the harrowing of the land with a drag-harrow after seeding will be sufficient.

The principal objection to 'breaking and backsetting is urged with regard to the backsetting which, no doubt, is heavy work for the teams, but if the discing required to reduce deep-breaking and then the ploughing or other cultivation that must be done in an effort to obtain a second crop, be taken into consideration it must be conceded that in the end 'breaking and backsetting' is the cheaper and better method.

When two crops have been taken from new land it should be summer-fallowed.

SUMMER-FALLOWS AND SUMMER-FALLOWING.

Among the many advantages to the credit of the practice of summer-fallowing may be mentioned:—The conservation of moisture, the eradication of weeds, the preparation of the land for grain-crops at a time when no other work is pressing, the availability of summer-fallowed land for seeding at the earliest possible date in the spring and the minor advantages of having suitable land for the growing of pure seed, potatoes, roots and vegetables at the least cost and with the greatest chance for success, and that of being able to secure two crops of grain with little or no further cultivation.

Summer-fallowing undoubtedly has some disadvantages, but so long as the growing of grain, and more particularly wheat, remains the principal industry of the province, it will be necessary to store up moisture against a possible dry season, to restrain the weeds from over-running the land and on account of the short seasons, to prepare at least a portion of the land to be cropped in the year previous to seeding and a well-made summer-fallow is the best means to this end. Among the disadvantages are:—The liability of the soil to drift, the over-production of straw in a wet season, causing late maturity and consequent danger of damage by frost, and it is claimed, the partial exhaustion of the soil. The two former may, to a great extent, be overcome by different methods of cultivation, and if the soil can be prevented from drifting, I am satisfied that one of the reasons for the latter contention will disappear.

Various methods are practised in the preparation of fallow and where the aim has been to take advantage of the June and July rains and to prevent the growth of weeds, success is almost assured. Where the object has been to spend as little time as possible on the work, failure is equally certain.

In my annual report for the year 1889, the following was submitted for the consideration of the settlers. Since then many experiments have been conducted on the Experimental Farm with different systems and again I submit what, on the whole, have been found to be the most successful methods for the cultivation of the soil in Saskatchewan:—

FROM REPORT OF 1889.

December 29.

'The year just past has been one of extremes. Last winter was one of the mildest on record and March was so very fine that thousands of acres of grain were seeded from the 15th to the 31st, and at no time in the history of the country has the ground been in better condition for the reception of the seed. Immediately after seeding, however, exceptionally high winds set in, followed by extreme drought during the entire growing season. In many places the crops were injured by the winds and finally almost ruined by the succeeding dry weather. In some localities, however, where the farming had been done in accordance with the requirements of the country the crops did fairly, and considering the excessively dry weather, remarkably well.

'The Experimental Farm suffered in company with every other farm in the country. Perhaps very few suffered as much from winds, but the dry weather, though reducing the yields, did not prove so disastrous as to many others. In this portion of the Territories at least, every settler knows the importance of properly preparing his land. For several years after the country became open for settlement every one imagined that grain would grow, no matter how put in, but now the man is devoid of reason who thinks he is sure of a crop without any exertion on his part. It is true that since 1882 we have had one year in which the land required little or no preparation for the production of an abundant crop but only too many realize the loss in the remaining years from poor cultivation.

'Our seasons point to only one method of cultivation by which we may in all years expect to reap something.

'It is quite within the bounds of possibilities that some other and perhaps more successful method may be found, but at present I submit that 'fallowing' the land is the best preparation to ensure a crop. Fallowing land in this country is not required for the purpose of renovating it, as is the case with the worn-out lands in the East, and it is a question as yet unsettled how much or how little the fallow should be worked but as we have only one wet season during the year, it has been proved beyond doubt that the land must be ploughed the first time before this wet season is over, if we expect to reap a crop in the following year. The wet season comes during June and July, at a time when every farmer has little or nothing else to do, and it is then that this work should be done. Usually seeding is over by the 1st May and to secure the best results the land for fallow should be ploughed from 5 to 7 inches deep as soon after this date as possible. Land ploughed after July is of no use whatever unless the rains in August are much in excess of the average. A good harrowing should succeed the ploughing and all weeds or volunteer grain be kept down by successive cultivation. A good deal of uncertainty is felt with regard to a second ploughing, some holding that it is useless; others maintaining that it is an injury; while others again have found it to give from five to ten bushels per acre more than one ploughing. So far the experiments on the Experimental Farm have shown that by far the best returns have been received from two ploughings; and more noticeably was this the case when the first ploughing had been completed in May or June. Without doubt, two ploughings cause a greater growth of straw and consequently in a wet year the grain is several days later in maturing, causing greater danger from frost; but taking the seasons so far passed, 1884 excepted, two ploughings with as much surface cultivation as possible in between, may be safely recommended.

'Above all it is of the greatest importance that the first ploughing be as deep as possible, and that it be done in time to receive the June and July rains.'

After seventeen years' further experience and observation the following was written on this subject in the Annual Report of the Experimental Farms for 1906.

FROM REPORT OF 1906.

Methods of Preparing Soil for Grain Crops.

METHODS OF PREPARING NEW GROUND.

'In view of the fact that every year brings to the Northwest many new settlers who are unacquainted with the methods of breaking up and preparing new land for crop, a few suggestions with regard to this important work may not be amiss.

'In all sections where the sod is thick and tough, breaking and backsetting should be done; while in the districts where bluffs abound and the sod is thin, deep breaking is all that is necessary.

'The former is generally applicable to the southern and western portions, and the latter to the northeastern part of Saskatchewan, where the land is more or less covered with bluffs.

BREAKING AND BACKSETTING.

'The sod should be turned over as thin as possible, and for this purpose a walking plough with a 12 or 14-inch share, is the best. When the breaking is completed (which should not be later than the second week in July), rolling will hasten the rotting process and permit backsetting to commence early in August.

'Backsetting is merely turning the sod back to its original place, and at the same time bringing up two or three inches of fresh soil to cover it. The ploughing should be done in the same direction as the breaking and the same width of furrow turned. Two inches below the breaking is considered deep enough but three to four inches will give better results.

'After backsetting, the soil cannot be made too fine, and the use of disc or Randall harrow to cut up every piece of unrotted sod, will complete the work.'

DEEP BREAKING.

'Deep breaking, which in some sections of the country is the only practicable way of preparing new land, and which is, unfortunately, done in some instances where breaking and backsetting would give much more satisfactory results, consists in the turning over of the sod as deeply as possible, usually from four to five inches. When the sod has rotted, the top soil should be worked and made as fine as possible. The use of harrow or disc will fill up all irregularities on the surface, and make a fine, even seed bed.

'Whether the land is broken shallow or deep, it is necessary to have the work completed early, so as to take advantage of the rains which usually come in June or early in July. These rains cause the sod to rot, and without them, or if the ploughing is done after they are over, the sod remains in the same condition as when turned, and no amount of work will make up for the loss.'

SUMMER FALLOWS.

'The true worth of properly prepared fallows has been clearly demonstrated in past years in every district of Saskatchewan.

'The work of preparing land for crop by fallowing is carried on in so many ways in different parts of the country, that perhaps a few words on some of the methods employed may be of use to at least some of the new settlers.

'It has been observed in some parts of Saskatchewan that the land to be fallowed is not, as a rule, touched until the weeds are full grown and in many cases, bearing fully matured seed. It is then ploughed.

'By this method, which, no doubt, saves work at the time, the very object of a summer-fallow is defeated. In the first place, moisture is not conserved because the land has been pumped dry by the heavy growth of weeds; and, secondly, instead of using the summer-fallow as a means of eradicating weeds, a foundation is laid for years of labour and expense by the myriads of foul seeds turned under.

'The endless fields of yellow-flowered weeds, generally Ball Mustard (*Neslia paniculata*), testify to the indifferent work done in many districts, and, while no weed is more easily eradicated by a good system of fallows, there is no weed that is more easily propagated or takes greater advantage of poor work on fallows or of fall or spring cultivation.

'As has been pointed out in my previous reports, early and thorough work on fallows is absolutely necessary to success, and I here repeat the methods and results of tests carried on for some years past.

'*First Method.*—Ploughed deep (6 to 8 inches) before last of June; surface cultivated during the growing season, and just before or immediately after harvest ploughed 5 or 6 inches deep.

'Result—Too much late growth if season was at all wet, grain late in ripening, and a large crop of weeds if the grain was in any way injured by winds.

'*Second Method.*—Ploughed shallow (3 inches deep) before the last of June; surface cultivated during the growing season, and ploughed shallow (3 to 4 inches deep) in the autumn.

'Result.—Poor crop in a dry year; medium crop in a wet year. Not sufficiently stirred to enable soil to retain the moisture.

'*Third Method.*—Ploughed shallow (3 inches) before the last of June; surface cultivated during the growing season, and ploughed deep (7 to 8 inches) in the autumn.

'Result.—Soil too loose and does not retain moisture. Crop light and weedy in a dry year.

'*Fourth Method.*—Ploughed deep (7 to 8 inches) before the last of June; surface cultivated during the growing season.

'Result.—Sufficient moisture conserved for a dry year and not too much for a wet one. Few or no weeds, as all the seeds near the surface have germinated and been killed. Surface soil apt to blow more readily than when either of the other methods is followed. For the past fourteen years, the best, safest and cleanest grain has been grown on fallow worked in this way, and the method is therefore recommended.

'Fallows that have been ploughed for the first time after the first of July, and especially after July 15, have never given good results; and the plan too frequently followed of waiting till weeds are full grown, and often ripe, and ploughing under with the idea of enriching the soil, is a method that cannot be too earnestly advised against.

'In the first place, after the rains are over in June or early in July, as they usually are, no amount of work, whether deep or shallow ploughing, or surface cultivation, can put moisture in the soil. The rain must fall on the first ploughing and be conserved by surface cultivation.

'Weeds, when allowed to attain their full growth, take from the soil all the moisture put there by the June rains, and ploughing-under weeds with their seeds ripe or nearly so, is adding a thousand-fold to the myriads already in the soil, and does not materially enrich the land.'

During the past two years the term 'dry farming' has been applied to what was formerly known in the West as 'summer-fallowing.'

With the exception of the addition of the use of a soil-packer there is no change in the methods formerly employed, when the spring rains and frequent cultivation were depended upon for the packing of the soil.

Packers are, without doubt, most useful implements on the farm and where from any cause, the soil is loose, they should be used. They are, however, expensive implements and within the means of comparatively few of the new settlers. Fortunately, early ploughing and frequent shallow cultivation may be depended upon to produce almost equally satisfactory results in the majority of cases.

CULTIVATION OF STUBBLE.

When farmers summer-fallow one-third of their cultivated land each year, as they should, one-half of each year's crop will be on stubble. For wheat, the best preparation of this land is to burn the stubble on the first warm, windy day in the spring, and either cultivate shallow before seeding or give one or two strokes of the harrow after seeding, the object being to form a mulch to conserve whatever moisture may be in the soil, until the commencement of the June rains.

The portion intended for oats or barley, should be ploughed four or five inches deep and harrowed immediately; then seeded and harrowed as fine as possible. In

case time will not permit of ploughing, good returns may be expected from sowing the seed oats or barley on the burnt ground, and discing it in; then harrowing well.

FALL PLOUGHING.

With regard to fall ploughing it may be said that, as a rule, on account of short seasons and dry soil, very little work can possibly be done in the fall, but if the stubble-land is in a condition to plough and the stubble is not too long, that portion intended for oats and barley may then be ploughed, if time permits.

It is, however, a mistake to turn over soil in a lumpy or dry condition, as nine times out of ten it will remain in the same state until May or June, with insufficient moisture to properly germinate the seed, and the crop will very likely be overtaken by frost.

As to the quantity of seed sown and the depth of sowing, long experience has shown that the best results are had in Saskatchewan by the sowing of one and a half bushels of wheat per acre or two bushels of barley or oats. Sowing about two inches deep has given the most satisfactory returns, and the seed should be got in as early as is practicable.

HORSES.

Nine work horses were on the Farm for the past year, with two drivers.

A few days ago four registered brood mares were obtained.

CATTLE.

At present the herd consists of one Shorthorn bull three years old, three young bull calves, eighteen pure bred cows and heifers, fifteen head of yearlings and calves and five grades, cows and yearlings.

Fifteen steers were obtained last fall for feeding tests but had to be sold after the fire for want of room and feed.

SHEEP.

The flock of breeding animals consists of one pure bred Shropshire ram, and three ewes, eleven grade ewes and seven lambs.

One hundred lambs were obtained in the fall for feeding and were divided into four lots of twenty-five each.

The fire caused the test to be discontinued, and since then the animals are being disposed of as opportunities occur.

SWINE.

Berkshire and Yorkshire pigs are kept and at present there are one boar and one sow of the former and one boar and three sows of the latter.

Fifteen young pigs were sold for breeding purposes during the past year.

POULTRY.

Two breeds, Barred Plymouth Rocks and Black Minoreas, have been kept on the Farm for the past few years. Cockerels and eggs are sold.

DISTRIBUTION OF SAMPLES.

A distribution of samples of the products of the farm, was made in the spring to residents of Saskatchewan. The following is a list of the samples sent out:—

Potatoes, 3-lb. bags, 340.

Small seeds, 131 packages containing 2,358 packets of Flower, Garden and Shrub seeds.

Tree Seeds, Maple, 249 packages of 1-lb. each.

Tree Seeds, Ash, 18 packages of 1-lb. each.

Tree Seeds, Shrubs, 34 packages of 1-lb. each.

Tree and Shrub seedlings, 705 packages containing 75 trees each.

Express parcels, trees and shrubs, 29 packages containing 50 trees each.

Crab-apple and plum seedlings, 39 packages containing 12 trees each.

Rhubarb roots, 60 packages containing 6 roots each.

Inoculated soil, 265 packages of 100 lbs. each were taken from one of the old alfalfa plots and shipped to residents in the province, the applicants paying freight charges and cost of bag.

CORRESPONDENCE.

During the twelve months ending March 31, 1912, 16,407 letters were received and 16,296 mailed from this office.

In letters received, reports on samples are not included, and in letters mailed circulars of instructions sent out with samples are not counted.

METEOROLOGICAL RECORDS.

Month.	Temperature. F.					Rainfall.		Snowfall.	Sunshine.
	Maximum.		Minimum.		Mean.				
1911.	Date.	°	Date.	°	°	Days.	Inches.	Inches.	Hours.
April	26	73	3	2	35·90	1	·04	2·5	236·9
May	5	90	1	15	50·16	6	2·57	12·	224·2
June	18	92	26	38	62·34	7	4·28	.....	225·9
July	15	86	16	36	59·	11	3·03	.....	266·9
August	13	86	25	31	58·09	12	3·53	.....	235·9
September	13	79	24	20	48·20	5	·82	.....	158·7
October	9	78	31	— 2	38·58	3	1·95	·50	134·6
November	4	56	14	—20	13·	.....	.....	10·85	103·7
December	4	40	28	—31	9·58	.....	.....	3·50	53·3
1912.									
January	30	36	11	—47	—8·06	.....	.....	3·45	68·8
February	15	35	3	—26	7·41	.....	.....	1·50	101·9
March	27	42	1	—28	6·93	.....	.....	4·	156·4
						45	16·22	38·30	1,967·2

* Reckoning ten inches of snowfall as equivalent to one inch of rainfall, the total precipitation for the year ending March 31, 1912, was 20·05 inches.

I have the honour to be, sir,
Your obedient servant,

ANGUS MACKAY,
Superintendent.

EXPERIMENTAL STATION FOR CENTRAL SASKATCHEWAN.

REPORT OF WM. A. MUNRO, B.A., B.S.A., SUPERINTENDENT.

ROSTHERN, SASK., March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director Experimental Farms,
Ottawa, Canada.

SIR,—I have the honour to present herewith the third annual report of the Dominion Experimental Station at Rosthern, Sask.

The season of 1911 opened for seeding operations about the middle of April and was characterized by a very average rainfall, well distributed throughout its whole length. There was not a downpour at any time sufficiently heavy to cause water to run off the land, but all the rain which fell was absorbed. This condition was favourable for a luxuriant growth of all kinds of crops including trees and shrubs. While stimulating growth, however, these conditions retarded the maturing of the crops, with the result that much grain was unripe when the first severe frost came on August 26. Not only at the Experimental Station was the grain damaged by frost but the condition existed throughout a large portion of the province.

SPRING WHEAT.

Fifteen varieties of spring wheat were grown on one-fortieth acre plots. These were sown on April 24.

Number.	Variety.	Days Maturing.	Yield per Acre.		Weight per Measured Bushel after Cleaning.
			Bush.	Lbs.	
1	Huron	107	73	20	59
2	Marquis	98	70	..	61
3	Preston. (Seed from Seager Wheeler)	107	66	40	56·5
4	Chelsea.	102	66	..	58
5	Pringle's Champlain	102	65	20	57·5
6	Riga	107	64	40	55
7	Stanley.	107	62	40	57·2
8	Bobs.	102	62	..	59
9	Red Fife. (Geo. L. Smith)	98	60	..	56
10	Early Red Fife	107	60	..	55·5
11	White Fife	107	59	20	50·5
12	Bishop	102	58	40	57·5
13	Red Fife	107	55	20	51·2
14	Red Fife "Regenerated"	107	50	..	49·5
15	Kubanka.	107	37	20	51·8

OATS.

Fifteen varieties of oats were under test. Those marked below 6 for strength of straw were lodged and difficult to cut.

Number.	Variety.	Days Maturing.	Strength of Straw.	Yield per Acre.		Weight per Measured Bushel after Cleaning.
				Bush.	Lbs.	
1	Banner	127	5	131	26	39
2	Danish Island	127	4	130	20	38
3	20th Century	131	6	128	8	38·5
4	Irish Victor	127	5	128	8	37·5
5	Improved American	128	4	127	2	37
6	Gold Rain	131	7	127	2	38·2
7	Abundance	131	4	125	30	37·2
8	Abundance "Regenerated"	131	6	121	6	36
9	Ligowo	131	4	121	6	40
10	Swedish Select	131	5	117	22	39
11	Thousand Dollar	131	5	116	16	35
12	Siberian	135	7	109	14	36·5
13	Victory	131	7	109	14	39·5
14	Daubeney Selected	118	5	101	6	36
15	Sixty Day White	118	8	96	16	34·8

BARLEY.

Six varieties of two-row barley and nine varieties of six-row barley were grown on fortieth-acre plots. All but Early Indian made rank growth and those marked below 6 for strength of straw were considerably lodged. The Early Indian is a very short-strawed variety and very early, but in our case was badly infested with rust. Notwithstanding its rust and light yield, its earliness is so commendable that we shall continue to try it.

Number.	Variety.	Days Maturing.	Strength of Straw.	Yield Per Acre.		Weight per Measured Bushel after Cleaning.
	Six-Row Varieties.			Bush.	Lbs.	
1	Odessa	114	5	100	40	42·8
2	Manchurian	114	5	96	32	43·
3	O. A. C. No. 21	114	5	94	8	41·4
4	Black Japan	106	9	93	16	42·5
5	Stella	114	5	83	16	45·5
6	Mensury	109	8	81	32	43·8
7	Taganrog	109	4	81	32	43·5
8	Success	105	8	58	16	40·8
9	Early Indian	100	10	19	8	35·5
	Two-Row Varieties.					
1	Duckbill	114	4	85	..	45·5
2	Hannchen	113	3	81	32	50·5
3	Early Chevalier	107	8	79	8	50·8
4	Swan's Neck	114	3	78	16	48
5	Swedish Chevalier	114	3	71	32	44·5
6	Beaver	112	6	70	40	38·5

FIELD PEAS.

Ten varieties of field peas were grown on summer-fallow. The vines remained green till the frost came, as a consequence of which the germination of the threshed product was of a low percentage. The 'Arthur Selected' was nearer maturity than any of the others.

Number	Variety.	Yield.		No.	Variety.	Yield.	
		Bush.	Lbs.			Bush.	Lbs.
1	Arthur Selected	51	20	6	Chancellor	37	20
2	Mackay	48	..	7	White Marrowfat	36	..
3	Paragon	48	..	8	Wisconsin Blue	31	20
4	Prussian Blue	46	40	9	Black-eye Marrowfat	26	40
5	English Grey	38	..	10	Golden Vine	24	40

INDIAN CORN FOR ENSILAGE.

Seven varieties of fodder corn were grown and an estimate of yield made from two rows each 66 feet long. None of this corn came to tassel before the frost. Two sowings of each variety were made, one on May 19 and the other on June 14.

Number.	Variety.	Yield per Acre. 1st Sowing.		Yield per Acre. 2nd Sowing.	
		Tons.	Lbs.	Tons.	Lbs.
1	Compton's Early	11	1760	9	876
2	Longfellow	10	1780	9	1800
3	Selected Leaming	10	1020	8	1160
4	Northwestern Dent	9	1140	9	1140
5	Superior Fodder	8	1820	6	540
6	Eureka	8	1820	9	1140
7	Angel of Midnight	8	1160	8	1114

FIELD ROOTS.

Three varieties of sugar beets, eight varieties of mangels, five varieties of carrots and ten varieties of turnips were grown on summer-fallowed land, and the yield in each case computed from a row 66 feet long. Two sowings of each were made, one on May 19 and one on June 13.

Number	Variety.	Yield per Acre, 1st Sowing.		Yield per Acre, 2nd Sowing.	
	Sugar Beets.	Tons.	Lbs.	Tons.	Lbs.
1	Klein Wanzleben	12	552	7	520
2	Vilmorin's Improved	12	156	6	1,728
3	French Very Rich	11	1,760	8	1,160
	Mangels.				
1	Half Sugar White	26	800	15	1,812
2	Giant Yellow Globe	21	636	13	400
3	Selected Yellow Globe	21	636	9	1,536
4	Gate Post	20	788	13	1,060
5	Mammoth Long Red	19	1,600	12	816
6	Perfection Long Red Mammoth	19	280	14	776
7	Giant Yellow Intermediate	16	1,396	8	896
8	Yellow Intermediate	16	1,000	8	1,820
	Carrots.				
1	Improved Short White	12	24	5	1,880
2	Mammoth White Intermediate	11	1,760	6	1,200
3	White Belgian	11	440	4	1,240
4	Ontario Champion	9	1,536	5	824
5	Half Long Chantenay	9	1,008	4	580
	Turnips.				
1	Hall's Westbury	25	1,348	9	876
2	Mammoth Clyde	25	556	13	1,980
3	Jumbo	23	728	13	1,720
4	Bangholm Selected	22	88	12	816
5	Halewood's Bronze Top	21	1,824	12	816
6	Carter's Elephant	21	1,164	8	104
7	Good Luck	20	920	11	836
8	Hartley's Bronze	19	1,676	14	1,304
9	Magnum Bonum	18	168	13	1,060
10	Perfection Swede	16	340	11	440

Plot of Beaver Barley, Experimental Station, Rosthern, Sask.

Grading Roads with the Split-log Drag, Experimental Station, Rosthern, Sask.

POTATOES.

Seventeen varieties of potatoes were grown on summer-fallowed land and the yield computed in each case from one row 66 feet long.

Number.	Variety.	Colour.	Yield per Acre.	
			Bush.	Lbs.
1	Empire State	White	585	12
2	Dreer's Standard	"	528	..
3	Money Maker	"	514	28
4	Everett	Red	497	12
5	Reeves' Rose	"	484	..
6	Ashleaf Kidney	White	479	36
7	Morgan Seedling	"	475	12
8	Rochester Rose	Red	453	12
9	Gold Coin	White	453	12
10	Dalmeny Beauty	"	448	48
11	Vick's Extra Early	Red	431	12
12	Late Puritan	White	431	12
13	Irish Cobbler	"	365	12
14	Carman No. 1	"	356	24
15	American Wonder	"	264	..
16	Hard-to-Beat	"	206	48
17	Factor	"	193	36

ROTATION EXPERIMENTS.

Four rotations were begun in the spring of 1912, each plot in each rotation being exactly two acres in area. As well as being an experiment in rotations, careful record is kept of all labour, both horse and manual, all wear and tear of machinery, cost of manure and seed, and revenue from all products received from the different rotations, with the idea of arriving at an estimate of the cost of production.

The rotations are as follows:—

Rotation 'C.'

1. Wheat.
2. Wheat.
3. Summer-fallow.

Rotation 'J.'

1. Summer-fallow.
2. Wheat.
3. Wheat.
4. Oats seeded down.
5. Hay.
6. Pasture.

Rotation 'P.'

1. Summer-fallow.
2. Wheat.
3. Wheat.
4. Summer-fallow.
5. Hoed crop or Legume.
6. Barley seeded down.
7. Hay.
8. Pasture.

Rotation 'R.'

1. Summer-fallow.
2. Hoed Crop or Legume.
3. Wheat.
4. Oats.
5. Summer-fallow.
6. Wheat.
7. Oats seeded down.
8. Hay.
9. Pasture.

CULTURAL INVESTIGATION WORK.

In the spring of 1911 was begun a series of thirteen experiments in Cultural Investigation work. This included experiments in Prairie Breaking, Depth of Ploughing, Summer-fallow Treatment, Stubble Treatment, Seeding to Grass and Clover, Breaking Sod, Applying Barnyard Manure, Green Manuring, Seed bed Preparation, Soil Packers, Depth of Seeding, Commercial Fertilizers and Underdraining. The part devoted to this work comprises an area of twenty-one acres and is divided into 493 fortieth-acre plots. The work in 1911 was preliminary in character.

VEGETABLE GARDEN.

There is but a small area enclosed by a windbreak, and in this we grew as much as we could of the vegetable and flower garden. Beans, peas, parsnips, turnips, beets and carrots were sown in the open on land which had been previously summer-fallowed, but they came to nought because of the cutworm. The tomatoes, cucumbers, melons and squash, although started in the hot-bed and planted within the sheltered enclosure, failed to mature before the frost, although strong growth was made throughout the season. The corn also did not mature.

CABBAGE.

Sixteen varieties of cabbage were sown on April 19 and transplanted on May 29 and made remarkable growth, one head of the Flat Swedish weighing 25 lbs. 4 oz. and eight heads of the same variety averaging 15 lbs. each.

CAULIFLOWER.

Three varieties of cauliflower were sown and transplanted on the same dates as the cabbage and were ready for use by the end of July. The Extra Selected Early Erfurt Dwarf produced the largest percentage of good heads.

ONIONS.

Six varieties of onions were grown in rows thirty feet long with the following yields:—

Dark Wethersfield	20 lbs.
Yellow Globe Danvers	19 "
Salzer's Wethersfield	16½ "
Southport Red Globe	16 "
Johnson's Dark Red Beauty	15 "
Large Red Wethersfield	8 "

Yellow Globe Danvers was considered to be of the best quality. Large Red Wethersfield might have made a better showing but was thin in the row.

FRUITS.

Among upwards of four hundred apple trees received in 1909 and transplanted in 1910, more than 80 per cent. came through the winter of 1911 in good condition. The vacancies were filled and two more rows of twenty trees each added in 1911.

The bush fruits planted in 1910 did not do well because of the dry season and the consequent drifting sand, and a new plantation was put out in 1911 consisting

of nine varieties of black currants, fourteen varieties of red and white currants, two varieties of gooseberries and four varieties of raspberries. The rows were six feet apart and between the rows of bush fruits were sown two rows of sunflowers. The sunflowers soon became a protection from the wind and in the winter served to lodge the snow and afford a splendid protection, with the result that the plants appeared in the spring in good condition.

TREES AND SHRUBS.

About two hundred ornamental shrubs and trees were planted along the driveway and about the lawn in 1911, and all the deciduous ones did well. The evergreens, however, including varieties of spruce, fir and pine which came from outside the province, nearly all died. Forty native spruce were obtained from the timber reserve ten miles north of Duck Lake and all but one came through to the spring of 1912 in good condition.

Nearly two acres of lawn were seeded in 1911. Half was seeded with a thin sowing of barley as a nurse crop, but, as the season was moist, no particular advantage seemed to accrue from this method. The season previous, the lawn had been seeded without a nurse crop, but the summer being dry, the seed did not germinate and was blown out.

PLANTS AND FLOWERS.

Good success has been obtained with bulbs both in bedding outside and in potting in the house. The directions were followed as per W. T. Macoun's Bulletin on Bulb Culture.

Three hundred bulbs of Narcissi, Tulips and Hyacinths were potted in November, well watered and placed in a cool, dark cellar. They were watered at intervals of from two to three weeks, and the first ones were brought to a light room during the Christmas holidays. About a week after being brought to the light in a warm room and well watered, the flower opens and lasts nearly two weeks. A continuous bloom was obtained from the Christmas holidays until April.

A large number of varieties of flowering annuals, including six varieties of Asters, four Balsams, three Celosia, one Coreopsis, six Dianthus, one Eschscholtzia, Gaillardia, two Godetia, Lobelia, Mignonette, Nicotiana, Pansies, Phlox, Poppies, Portulaca, Salpiglossis, Scabiosa, Stocks, Nasturtiums and Zinnias, all made good growth and in most cases came to flower before frost. These plants were started in the hot-bed and transplanted to a sheltered enclosure in the middle of May.

LIVE STOCK.

There are five work horses and one driver on the Station. After the commencement of the Cultural Investigation work, another horse was found necessary.

There are two grade dairy cows which supply sufficient milk for the needs of the families living on the Station.

LABOUR.

Accommodations for the men employed on the Station were much improved in 1911 over those of 1910. The house formerly occupied by the foreman was divided and enlarged and part of it converted into a boarding house. This served as an inducement for a better class of labour. Of the men engaged in May as many as were required remained until after harvest.

ACKNOWLEDGMENTS.

Mr. James Dunlop assumed the duties of foreman in November, 1910, and has been unremitting and efficient in his work ever since. His management of the men and his grasp of the work are very creditable.

Credit is due the Secretary of the Board of Trade in Saskatoon for supplying us with an efficient class of labourers.

CORRESPONDENCE.

During the year there were 873 letters received and 535 sent out, irrespective of circulars.

METEOROLOGICAL RECORDS.

Month.	Temperature. F.				Mean.	Precipitation.	Hours of Sunshine.
	Date.	Max.	Min.	Date.			
April	23	72·7	1·7	6	37·1	0·86	231·8
May	6	82·2	27·2	20	48·0	2·38	219·1
June	20	84·7	38·2	9	61·1	3·55	262·0
July	7	87 5	38·6	24	56·9	2·89	270·0
August	20	84·8	32·2	27	56·0	1·79	280·6
September	11	71·1	20·8	25	46·7	1·81	193·7
October	9	78·1	4·7	31	38·1	.....	170·5
November	5	51·0	-28·1	15	9·1	0·90	130·5
December	3	32·4	-42·8	31	7·6	0·85	60·4
January	31	34·4	-54·1	11	-12·52	0·30	101·6
February	16	39·3	-27·8	4	5·5	0 30	115·7
March	28	40·4	-30·0	2	4·09	0·60	222·7

Note.—In the above table, ten inches of snow is taken as equivalent to one inch of rainfall or precipitation.

I have the honour to be, sir,
Your obedient servant,

WM. A. MUNRO,
Superintendent.

EXPERIMENTAL STATION FOR NORTH-WESTERN SASKATCHEWAN.

REPORT OF R. E. EVEREST, B.S.A., SUPERINTENDENT.

J. H. Grisdale, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa, Canada.

Scott, Sask., March 31, 1912.

Sir,—I have the honour to submit to you the second annual report of the work done with the results obtained on the Experimental Station for Northwestern Saskatchewan at Scott for the year ending March 31, 1912.

In the spring of 1911 work on the land was possible about April 15. Harrowing was commenced on April 18 and the first wheat was sown in field lots on April 29.

Grain crops germinated well and came up evenly. When about three inches of growth had been attained the dry condition of the soil apparently was affecting the plants, shown by the edges of the outer leaves taking on a blighted, whitish colour. This condition was soon corrected by frequent good rains and the succeeding summer's growth of all cereal crops was remarkable.

By the beginning of August grain crops were fully in head and turning well for harvest. The promise was good. On August 13, in the evening, a severe wind, rain and hail storm passed through this neighbourhood almost totally destroying the maturing grain. That which remained was injured to such an extent that with continued backyard, cool weather, ripening was prolonged till early frosts further affected the yield in quality and quantity.

The season for fall work was short. By October 28 the plough was stopped. On November 1 the thermometer registered below zero and from then up till March 21, 1912, favourable winter weather prevailed.

EXPERIMENTS WITH SPRING WHEAT.

Six varieties of spring wheat were sown on May 17 at the rate of about one and three-quarters bushels per acre. The land in 1910 had been broken shallow out of prairie, packed, left till after harvest when it was backset five inches deep, single disced and double harrowed. The growth and general appearance of these crops were satisfactory until reduced first by storm and later with frost.

Each plot was one-fortieth of an acre in size, and the soil was a chocolate clay loam with a clay subsoil. The threshed grain from these plots is of poor quality.

Spring Wheat—Test of Varieties.

Name of Variety.	Date of Sowing.	Date of Cutting.	Number of days Maturing.	Kind of Head.	Weight of Straw.	Yield per Acre.	
					Lbs.	Bush.	Lbs.
Huron	May 17	Sept. 19	125	Bearded	3,670	5	30
Marquis	" 17	" 12	118	Bald	4,560	4	..
Early Red Fife	" 17	" 19	125	"	4,240	2	40
Stanley	" 17	" 19	125	"	3,040	2	40
Preston	" 17	" 19	125	Bearded	2,525	1	15
Red Fife	" 17	" 19	125	Bald	2,730	1	10

SPRING WHEAT—Quantities of Seed.

Marquis spring wheat was used on four plots in the quantities of seed per acre test. Under the conditions which prevailed last season the largest quantity of seed gave the best return.

Variety.	Bushels Seed per Acre.	Number of Days Maturing	Weight of Straw.	Yield per Acre.	
			Lbs.	Bush.	Lbs.
Marquis	¾	125	3,475	2	5
"	1¼	118	4,000	3	20
"	1¾	118	4,560	4	..
"	2¼	118	3,880	5	20

YIELDS OF SPRING WHEAT IN FIELD LOTS.

The Huron variety was used in all field lots of spring wheat. These fields were sown on April 29 and May 1. Six lots were mostly on breaking and backsetting and two were on deep breaking. In general appearance the wheat on deep breaking had the advantage of that growing on the land shallow broken and backset and was ahead in yield which fact, however, is of no value, for these two lots were not so near the storm centre as the other six were. Growth of all the wheat was remarkable as they were nearing maturity ahead of earlier sown fields. The only known difference in treatment to other fields in the locality is that when grain was about three inches high and threatened with drought, the fields here were given one stroke with the drag harrow.

The seed was sown at the rate of one and three-quarters bushels per acre.

Variety.	Yield.	Size of Plot.	Date of Sowing.	Date of Cutting.	Days Maturing.	Kind of Head.	Yield per Acre.	
		Acres.					Bush.	Lbs.
Huron	Rot. C. 2...	1·5	April 29..	Sept. 9..	133	Bearded..	6	23
"	" C. 3...	1·5	May 1..	" 9..	131	" ..	7	47
"	" J. 2...	2·2	" 1..	" 7..	129	" ..	12	57
"	" J. 3...	2·2	" 1..	" 7..	129	" ..	18	4
"	" P. 2..	1·5	" 1..	" 9..	131	" ..	5	20
"	" P. 3...	1·5	" 1..	" 9..	131	" ..	8	7
"	" R. 3...	2·3	April 29..	" 11..	135	" ..	5	26
"	" R. 6...	2·0	" 29..	" 11..	135	" ..	8	12

EXPERIMENTS WITH OATS.

Five varieties of oats were sown on May 17 at the rate of about two and one-quarter bushels per acre. The land in 1910 had been broken shallow out of prairie, packed, left till after harvest when it was backset five inches deep, single disced and double harrowed. Each plot was one-fortieth of an acre in size and the soil was a chocolate clay loam with a clay subsoil. These varieties were almost totally destroyed by storm.

OATS—Test of Varieties.

Name of Variety.	Date of Sowing.	Date of Cutting.	Number of Days Maturing.	Kind of Head.	Weight of Straw.	Yield per Acre.
					Lbs.	Bush. Lbs.
White Giant	May 17	Sept. 12	118	Branching	3,260	4 4
Banner	" 17	" 12	118	"	4,280	3 18
Abundance	" 17	" 13	119	"	3,900	2 32
Danish Island	" 17	" 12	118	"	3,125	2 7
Improved Ligowo	" 17	" 13	119	"	2,140	1 26

OATS—Quantities of Seed.

White Giant oats were sown in eight different amounts per acre commencing at one and one-quarter bushels and increasing one-half bushel on a plot until four and three-quarters bushels per acre was reached. The returns obtained under last season's conditions do not point to any particular amount as giving the best result. These plots were almost totally destroyed by storm.

Variety.	Bushels Seed per Acre.	Number of Days Maturing.	Weight of Straw.	Yield per Acre.
			Lbs.	Bush. Lbs.
White Giant	1¼	118	3,670	3 28
"	1½	118	3,710	2 22
"	2¼	118	3,260	4 4
"	2½	118	3,900	2 32
"	3¼	118	3,470	3 28
"	3½	118	4,245	4 19
"	4¼	118	4,320	2 12
"	4¾	118	5,110	2 22

OATS—Depths of Seeding.

Two plots were sown to White Giant oats, one with the drill set at the shallowest notch, the second with the drill set at the deepest notch.

More grain was harvested from the shallow than from the deep-sown plot. These plots were almost totally destroyed by storm.

Variety.	Set of Drill.	Number of Days Maturing.	Weight of Straw.	Yield per Acre.
			Lbs.	Bush. Lbs.
White Giant	Shallow	118	3,840	4 24
"	Deep	118	4,465	3 33

YIELD OF OATS IN FIELD LOT.

One field lot of White Giant oats was threshed. This lot is an object lesson as to the extent of storm damage. The grain stood beautifully and seventy-five bushels per acre appeared to be a safe estimate. Following the storm the grain was still standing and to the casual observer not much the worse; to the closest and severest inspection a seventy-five per cent damage was estimated, and the lot actually threshed about eight bushels per acre. Oats, owing probably to the size and spread of the head, suffer to a greater extent than wheat in severe storm.

Variety.	Field.	Size of Plot.	Date of Sowing.	Date of Cutting.	Days Maturing.	Kind of Head.	Yield per Acre.
		Acres.					Bush. Lbs
White Giant	Rot. J. 4..	2·2	May 8.....	Sept. 7....	122	Branching..	8 1

OATS AND PEAS AND OATS FOR GRAIN FEED.

Six lots of peas and oats and two lots of oats were harvested as green feed. A considerable amount of feed was obtained per acre which, on account of lack of grain, was not highly nutritive. A larger return was obtained from the peas and oats than from oats alone. In the former a heavier seeding was given, the latter were first intended for grain crop and seeded at the ordinary rate which in part may account for the difference in yield.

Kind of Crop.	Field.	Size of Plot.	Date of Sowing.	Date of Cutting.	Yield per Acre.
		Acres.			Lbs.
Peas and Oats	Rot. J. 5..	2·2	May, 26..	Sept., 8..	5,741
" "	" " 6..	2·2	" 26..	" 7..	4,650
" "	" P. 7..	1·5	" 29..	" 8..	4,773
" "	" " 8..	1·5	" 26..	" 8..	5,300
Oats	" R. 4..	2·3	" 6..	" 11..	3,826
"	" " 7..	2·0	" 8..	" 11..	4,355
Peas and Oats	" " 8..	2·3	" 29..	" 8..	4,372
" "	" " 9..	2·3	" 26..	" 8..	4,409

BARLEY AND PEAS.

Barley and peas were sown in plots for variety tests, and also single varieties in field lots. The growth of these crops was excellent, particularly in the field lots. The barley, which was within a few days of cutting when injured, looked good for a heavy yield. These crops, however, were totally destroyed and no return is possible.

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Trial Plots of Barley at the Scott Experimental Station.

Part of Flower Border at the Scott Experimental Station.

ALFALFA.

In the past summer a block was seeded to alfalfa of the Turkestan variety; the catch was good and the plants went into the winter with considerable top. This plot was inoculated with soil received from the Experimental Farm, Indian Head, Sask.

WINTER WHEAT.

Three seedings were made with two varieties of winter wheat, on August 9, August 15 and September 1. The varieties Alberta Red and Dawson's Golden Chaff were sown. The first two seedings had a moderate top at the conclusion of the growing season. The last seeding was not far advanced at freezing time.

ROTATIONS.

Four rotations were laid out and started last season. They are known as Rotation C, Rotation J, Rotation P and Rotation R.

ROTATION 'C'. THREE YEARS.

This rotation comprises 4·5 acres and was commenced as follows:—

First year—Summer-fallow.
Second year.—Wheat.
Third year.—Wheat.

ROTATION 'J'. SIX YEARS

This rotation comprises 13·2 acres, each plot containing 2·2 acres and was commenced as follows:—

First year.—Summer-fallow.
Second year.—Wheat.
Third year.—Wheat.
Fourth year.—Oats seeded down.
Fifth year.—Peas and oats seeded down.
Sixth year.—Peas and oats.

ROTATION 'P'. EIGHT YEARS.

This rotation comprises 12 acres, each plot containing 1·5 acres and was commenced as follows:—

First year.—Summer-fallow.
Second year.—Wheat.
Third year.—Wheat.
Fourth year.—Summer-fallow.
Fifth year.—Peas.
Sixth year.—Barley seeded down.
Seventh year.—Peas and oats seeded down.
Eighth year.—Peas and oats.

ROTATION 'R'. NINE YEARS.

This rotation comprises 20·7 acres, each plot containing 2·3 acres, and was commenced as follows:—

First year.—Summer-fallow.
Second year.—Peas.
Third year.—Wheat.
Fourth year.—Oats.
Fifth year.—Summer-fallow.
Sixth year.—Wheat.
Seventh year.—Oats seeded down.
Eighth year.—Peas and oats seeded down.
Ninth year.—Peas and oats.

On each plot seeded down the following mixture of seed was used:—

	Per Acre.
Western rye grass	10 lbs.
Alfalfa	3 "
Red clover	3 "

POTATOES.

Seventeen varieties of potatoes were tested in 1911, and in view of unfavourable weather conditions made a very good return. In the majority a fair size was attained, and in some varieties the cooking quality was excellent. All have proved sound and good keepers. The land in 1910 had been broken shallow out of prairie, packed, left till after harvest when it was backset five inches deep, single disced and double harrowed. In 1911 the ground was drag harrowed in early spring, later double disced, drag harrowed and packed. For planting the potatoes were cut into pieces with two eyes in each, and these pieces were planted in rows two and one-half feet apart the sets being placed one foot apart in the row. During the growing season the potatoes were scuffled and hoed as required to keep down weeds and loosen the soil. At the last stroke with the scuffer the moulds were turned out and some earth thrown to the rows.

POTATOES—Test of Varieties.

Name of Variety.	Planted.	Dug.	Aver. Size.	Quantity.	Total Yield per Acre.	Yield per Acre of Marketable.	Yield per Acre of unmarketable.	Form and colour.
				P.C.	Bu. Lbs.	Bu. Lbs.	Bu. Lbs.	
Everett	June 2	Sept. 23	Medium	85	328 54	240 54	88 ..	Red oval.
Ashleaf Kidney	" 2	" 23	"	90	302 30	238 59	63 31	Pink oval.
Empire State	" 2	" 22	"	80	286 ..	231 40	54 20	White oval.
Irish Cobbler	" 2	" 22	"	80	279 24	212 21	67 3	White round.
Morgan Seedling	" 2	" 22	"	85	268 24	179 30	88 34	Pink long.
Late Puritan	" 2	" 22	"	90	264 .	211 12	52 48	White oval.
Dreer's Standard	" 2	" 22	"	80	255 12	183 55	71 27	" "
Reeves' Rose	" 2	" 22	"	95	254 6	188 3	66 3	Red oval.
Dalmeny Beauty	" 2	" 22	"	90	240 54	163 49	77 5	White long.
Rochester Rose	" 2	" 22	"	80	234 18	175 44	58 34	Pink long.
Money Maker	" 2	" 22	"	85	225 30	178 9	47 21	White long.
Gold Coin	" 1	" 22	"	95	220 .	182 36	37 24	White oval.
Carman No. 1	" 1	" 22	"	90	200 12	158 10	42 2	" "
Factor	" 2	" 22	Small	90	199 6	95 35	103 31	White flat and long.
American Wonder	" 2	" 22	Medium	80	193 36	145 12	48 24	White oval.
Hard to Beat	" 2	" 23	Small	70	193 36	114 14	79 22	White long.
Vicks' Extra Early	" 2	" 22	Medium	85	165 ..	117 9	47 51	Pink oval.

ORCHARD.

On May 11, 1911, under the supervision of Mr. Macoun, Dominion Horticulturist, an orchard was staked out and tree setting commenced.

The plan of laying out adopted proved to be quick and accurate. The trees are set on the square, eighteen feet apart in the row and the rows have eighteen feet space between.

The plan as followed was:—The area was first measured and a stake placed for each row on the sides and across the ends. For this purpose six-inch garden labels were used. Then, commencing on the side for the second row, a sighting picket was placed at the stake marking the second row at each end. At one end one man remained and sighted for a line of eighteen-inch two-by-two stakes which were driven at distances not exceeding one hundred feet. Next, the one hundred-foot tape was carried down along this stake line, a third man carrying six-inch labels sighted the tape true and then placed a pin at the required distance for each tree. The hole diggers followed with a notch board, the centre notch was adjusted on the tree-marking pin; other pins were placed, one in the slot at each end of the board, the board was then removed, and the tree hole dug at centre pin. The planters followed with a similar board which was placed on the two pins remaining, the tree was then set to centre notch of board, which marked its position. This method of lining and marking for trees was fast. Its accuracy depended to quite an extent on the man sighting.

In the orchard, apple, plum and cherry trees were set out, with bush fruits and plants occupying the space between rows over a small area.

Forty-two varieties of apples were set out with a total of five hundred and thirty-four trees. The following are the varieties:—

Alberta,	Jewel,	Roberval,
Anisim,	Kelso,	Robin,
Antonovka,	Lowland Raspberry,	Rupert,
Bruno,	Lubsk Queen,	Russian Seedling,
Charlamoff,	Martha,	Silvia,
Clair,	Mendel,	Sorel,
Clive,	Milwaukee,	Petofsky,
Duchess,	Okabena,	Pony,
Florence,	Oscar,	Transcendent,
Golden,	Osman,	Virginia,
Granby,	Patten's Duchess,	Walton,
Hoadly,	Patten's Greening,	Wealthy,
Hibernal,	Percival,	Whitney,
Hyslop,	Pioneer,	Yellow Transparent.

Seventeen varieties of plums were set out with a total of one hundred and eighteen trees. The following are the varieties:—

Aitkin,	Hanska,	Opata,
Bixby,	Inkpa,	Sansoto,
Cheney,	Kaga,	Sapa,
Cheresoto,	Mankato,	Skuya,
Etopa,	Odegard,	Poka.
Ezaptan,	Omaha.	

Ten trees of Compass cherry were set out.

Twenty-three varieties of currants were planted with a total of one hundred and thirty-four bushes. The varieties are as follows:—

Lee's Prolific,	Buddenborg's,	Red Dutch,
Boskoop Giant,	Victoria Black,	Greenfield,
Raby Castle,	Success,	Victoria Red,
Stewart,	Collin's Prolific,	Red Grape,
White Cherry,	Topsy,	Wilder,
White Grape,	Clipper,	Pomona,
Large White,	Franco-German,	Cumberland.
Eagle,		

Six varieties of gooseberries were planted with a total of eighteen bushes. The following are the varieties:—

Carrie,	Houghton,	Red Jacket,
Downing,	Pearl,	Transparent.

Sixteen varieties of strawberries were put in with a total of seven hundred and fourteen plants. The varieties are as follows:—

Bederwood,	Lovett,	Splendid,
Clyde,	Nettie,	Warfield,
Crescent,	New Dakota,	Wilson,
Enhance,	Sample,	Wm. Belt,
Glen Mary,	Senator Dunlap,	3 W. S.
Haverland,		

The season of 1911 was favourable for this work of planting and starting trees and bushes, and the result was that a great majority of the trees and plants that were received and set in in good shape took root and made favourable growth. Later in the season, storms injured to some extent the bark and foliage, thus weakening the trees to withstand the severity of the winter.

In bush fruits, currants and raspberries did well and made a fair growth, some varieties beginning to bear.

A few varieties of strawberries made a good start blossoming freely and sending out runners, while others failed to root or establish themselves.

In addition to the orchard and small fruits, considerable work was done in setting out hedges and tree rows for ornamental and protective purposes.

VEGETABLES.

In the fore part of June, seeds were sown in the open of the vegetables in common use, such as turnips, beets, carrots, lettuce, peas, beans, onions and radish. Of these, the peas, beans, lettuce, onions and radish made rapid growth and were quite productive.

FLOWERS.

Fifty-five varieties of annuals were sown in the open about the middle of June. Of these special mention may be made for persistent beautiful bloom of the following:—

Alyssum,	Royal Marigold,	Nemophila insignis,
Maritimum,	Candytuft,	Poppy,
Calendula,	Mignonette,	Pansy.
Eschscholtzia,		

A number of these retained their brightness after the frosts had become quite pronounced.

LIVE STOCK.

In the spring of 1911, seven work horses were purchased, four young geldings of the Clydesdale breed of good quality and size, and three of the agricultural class (two mares and a gelding), all of good quality. These horses have all proved kind and good in harness. The mares are kept for breeding purposes as well as for work, and at present are carrying foals. The seven horses are now in a healthy condition.

CORRESPONDENCE.

From March 25, 1911, to March 31, 1912: letters received, 646; letters sent, 565.

METEOROLOGICAL REPORT.

DATING FROM RECEIPT OF EQUIPMENT.

Months.	Highest Temperature. F.		Lowest Temperature. F.		Precipitation.	Hours Sunshine.
1911.	Date.	Degrees.	Date	Degrees.	Ins.	
May	.....	.....	.....	.....	2·20	.....
June	18	85·4	7	32·9	4·08	273·3
July	25	81·0	12	31·6	3·95	289·3
August	19	84·0	27	29·5	2·71	292·3
September	10	73·9	25	22·2	1·92	171·3
October	8	80·5	31	4·7	·11	180·1
November	3	50·1	13	—21·8	·25	106·4
December	2	36·0	31	—37·8	·65	56·4
1912.						
January	21st	31·8	11	—48·3	·37	100·8
February	15th	36·5	29	—30·3	·08	97·3
March	27th	46·0	1	—31·8	·23	199·0
					16·55	1766·3

I have the honour to be, sir,
Your obedient servant,

R. E. EVEREST,
Superintendent.

EXPERIMENTAL FARM FOR SOUTHERN ALBERTA.

REPORT OF W. H. FAIRFIELD, M.S., SUPERINTENDENT.

LETHBRIDGE, ALBERTA, March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa, Ont.

SIR,—I have the honour to submit the fifth annual report of the operations on the Experimental Station for Southern Alberta, at Lethbridge, for the year ending March 31, 1912. Four crops have now been grown since the establishment of the Station on the virgin prairie.

The season of 1911 has been a somewhat disappointing one for farming operations in Southern Alberta. The crops suffered for moisture in late May and early June and when the rains did begin they continued throughout the growing season and into the autumn. The precipitation during August and September was very much above the average, the result being that crops did not mature in a normal manner and the fall frosts, which came earlier than usual, injured a great deal of the grain. Some damage was also done by hail, the most destructive storm being the one that occurred on August 15. The path of the storm extended from a point west of the Macleod and Calgary branch of the Canadian Pacific Railway, near Granum, in a southeasterly direction to the international boundary, passing through the city of Lethbridge and destroying, in all, approximately one million bushels of grain. The weather during September, October and November was unfavourable for threshing, so that by the first of December there was but little over half of the threshing completed throughout the greater portion of the southern part of the province.

THE HAIL STORM.

The hail storm just referred to occurred on August 15 and took in on its course the greater portion of the Station. All grain on the west side, or non-irrigated part of the Station, was destroyed and such straw as was left standing had to be cut with the mowing machine for green feed. The main path of the storm in its southeasterly course did not extend to the east side of the Station so that grain standing there was not injured nearly so much. The yield on the irrigated portion was reduced by the hail probably twenty to twenty-five per cent, but it is very difficult to estimate. The damage to the different kinds of grain on the irrigated test plots varied, depending on the ripeness of the variety at the time of the storm, so that the relative standing of the varieties this year, so far as yield is concerned, cannot be relied on to any great extent. No grain at all from the non-irrigated portion of the Station was threshed except a small amount of winter wheat that was cut before the hail storm.

CHARACTER OF SEASON.

The winter of 1910-11 was, on the whole, an average one. The coldest weather experienced was during January, on the 12th of which month the lowest temperature of the winter was recorded, being -45.°. There was sleighing from January 11 to

February 7, it being rather exceptional in the Lethbridge district to have such a long period of unbroken sleighing. The spring of 1911, like that of 1910, opened early. We did the first work on the land at the Station on March 11, doing some harrowing in the afternoon of that day. In a week or ten days it was possible to plough. The last spring frost was on May 28 when 29·6° was recorded and the first frost in the autumn was on August 27 when 29·4° was registered.

The seeding was done in good season and, as the soil was in excellent shape, crops of all kinds came on rapidly and were in a most promising condition until the dry weather during the latter part of May and early in June. On account of the extremely dry season of 1910, all the moisture in the subsoil for several feet down had been exhausted by the time the rains of September of that year came. The result was that the soil was moist only to a depth of a foot to sixteen inches when the spring of 1911 opened up. This was the case on all the land no matter how it had been treated during the season of 1910, summer-fallowed land having no more moisture than land which had raised a crop that year. Favourable growing weather brought on the crops rapidly with the result that this small amount of moisture in the soil was soon exhausted. The dry weather during the latter part of May and early June was the cause of the crops in many districts in this part of the province suffering. This was particularly so in the case of winter wheat which up to this time had looked better than it had for two or three seasons previous but it began to feel the need of moisture almost at once owing to its advanced stage as compared with spring grain. In fact it began to head out prematurely before the rains of the latter part of June came. Spring grain, being less advanced in growth, had not used so much of the soil moisture and was little, if any, affected by the drought. During the rest of the summer, ample rain fell and spring grain came on in excellent condition, but the winter wheat, where it had suffered from the drought, never rallied and the yield was consequently light. It might be well to state, however, that this was not the case in all districts.

The unusually wet weather that prevailed during July and August was unfavourable for haying, the consequence being that there was a small proportion of No. 1 hay made. The hay crop is beginning to be of greater importance each year with us, now that the farmers on irrigated lands have begun to seed down more extensively with alfalfa and grasses.

Besides the unfavourable weather conditions for threshing, there was another feature about the autumn that was out of the ordinary and particularly unfortunate; this was the fact that the temperature dropped down to 9·7° on October 25 and continued to drop low for several successive nights, the result being that the ground froze and destroyed many thousands of bushels of potatoes that had not been dug in the southern part of the province. The early closing in of the winter also worked special hardship to the sugar beet growers in the Raymond district.

CUTWORMS.

Considerable damage from cutworms was reported from various districts in the southern part of the province. In a few special instances, the trouble has been serious but in the aggregate the loss from this source has not been great. However, it is serious enough so that it will pay farmers to be on the lookout for them in the grain fields as well as in the gardens. The cutworm is the larva of a moth. The larvæ are from one-half to three-fourths of an inch long and feed at night, coming up and cutting the young tender plants off at, or just below, the surface of the ground.

Remedies.—Mix one-half a pound of Paris green and fifty pounds of bran thoroughly together while still dry, then moisten very slightly with just enough water to make the mass flaky but not sticky. Too much stress cannot be laid on the importance of thoroughly mixing, for practically each particle of bran should be poisoned if

possible. Scatter this on the field where the pests are known to be present. This can be done on a reasonably large scale by distributing from a wagon, throwing it ten or fifteen feet on either side by means of a shingle or paddle.

TWO FARMS.

Of the 400 acres on the Station, one-fourth can be irrigated; the balance is devoted to 'dry' or non-irrigated farming. Two experimental farms are really being operated at Lethbridge. Their object is, not to compare the relative merits of the two systems, but to study their individual problems. To aid in doing this and to prevent confusion, the report is divided into two parts. Part I. deals with the results from the non-irrigated or 'dry' farm, and Part II. with the results from the irrigated farm. In this connection, it might be well to point out that the yields of even the same variety of crop grown on the two farms in any season are not necessarily comparable, and that an increased yield on the irrigated portion may not be entirely due to irrgiation, owing to the fact that the preparation of the land in the two fields may not have been identical; in fact no effort is made to make it so.

Although many of the tests carried out are the same on both the dry and the irrigated farms, still it would be well for the reader, if he wishes to get a comprehensive grasp of the work, to read both parts.

PART I.—THE NON-IRRIGATED OR 'DRY' FARM.

EXPERIMENTS WITH WINTER WHEAT.

The only grain that was cut on the Station before the hailstorm was the winter wheat. Although this was cut and in the stook, the storm came with such violence that the kernels in the heads, which had had time to become thoroughly dry, were badly threshed out so that there was considerable loss in hauling the bundles in to be threshed. It would be difficult to estimate closely this loss but it certainly was material. As has been stated, the winter wheat was seriously affected by the drought in May and early June.

WINTER WHEAT—TEST OF VARIETIES.

Twelve varieties of winter wheat were tested. They were all planted September 3, 1910, on summer-fallowed land, at the rate of about one bushel per acre. They made a good stand, wintered well and were in excellent condition in the spring, but the early drought and hail materially reduced the yields.

WINTER WHEAT.—(Non-Irrigated).—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	Average Length of Straw, including Head.	Strength of Straw on a Scale of 10 Points.	Average Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	
		1910	1911	Ins.		Ins.		Lbs.	Bush.	Lbs.
1	Turkey Red No. 380	Sept. 3	Aug. 3	27	9	2¾	Bearded	1,680	38	20
2	Ghirka	" 3	" 2	28	7	3	Bald	1,560	36	17
3	New Kharkov No. 382	" 3	" 2	25	7¼	2½	Bearded	2,220	36	..
4	Kharkov	" 3	" 3	24	8½	2½	"	2,640	35	52
5	Dawson's Golden Chaff	" 3	" 2	26	9½	3	Bald	2,520	35	38
6	Azima	" 3	" 2	24	7	2½	Bearded	2,820	33	4
7	Red Velvet Chaff	" 3	July 31	26	9	3¾	"	2,520	31	..
8	Prosperity	" 3	Aug. 1	26	8	3	Bald	1,680	30	..
9	Reliable	" 3	" 3	32	8	2¾	Bearded	1,680	30	..
10	Early Windsor	" 3	" 3	29	7	3	Bald	1,860	29	..
11	Abundance	" 3	" 3	26	8	2½	"	3,120	26	..
12	Red Chief	" 3	" 3	28	9	3	"	1,440	24	..

FIELD LOTS OF WINTER WHEAT.

There was only a small acreage of winter wheat grown this season on the Station.

Variety.	Area.	Date Ripe.	Date Cut.	Yield per Acre.	
	Acres.			Bush.	Lbs.
Ghirka	0.33	Aug. 5	Aug. 5	37	40
Azima	0.13	" 5	" 5	34	12
Kharkov	1.76	" 4	" 5	31	15

With reference to the above yields, it should be stated that the land on which the first two were sown was a field that had been summer-fallowed two seasons in succession and consequently was in better condition than was the field on which the Kharkov was sown, this being summer-fallowed during the summer of 1910 only.

There was also a field of several acres sown with winter wheat near the main irrigation canal but this was influenced in part by seepage from the ditch and so was only partly ripe and cut at the time the hail storm occurred, so that it was impossible to ascertain the yield.

CULTURE OF WINTER AND OF SPRING GRAIN.

In my last year's report, several pages are taken up in discussing this subject and some little space is devoted to such subjects as 'best time to sow winter wheat,' 'rates of seed per acre' both of winter and of spring wheats as well as oats and barley, including the average results of experiments along these lines for the three preceding years. Recommendations are also given as to the preparation of sod land, sowing on fresh breaking, backsetting, summer-fallowing, etc. On account of all our tests along this line being destroyed this season, there is nothing to add to last year's information in this report, but any one interested can obtain a copy of last year's report by applying to the Experimental Station, Lethbridge for the same.

CULTURAL WORK.

In order to determine the cultural methods which are of the greatest economic importance in reference to the conservation of soil moisture and the production of crops, five hundred and eight one-fortieth acre plots were set aside at this Station in the spring of 1911. Careful record is kept of the dates and number of times each plot is ploughed, packed, harrowed or disced and of the dates of seeding, harvesting and threshing. In conjunction with the latter, records of yields are taken. Besides these fundamental records, notes are taken on the condition of the soil and weather when the seed is sown. Meteorological observations week by week are also kept throughout the season and notes on all and every influence that might affect the crop's germination, growth, development, ripening, harvesting and threshing. The last-named data should prove invaluable in the way of accounting for any contradictory results that might be obtained from the same methods of treatment.

There are thirteen cultural experiments in operation on this Station at the present time and following is a brief outline of each one.

Experiment No. 1.—'Prairie Breaking'—Ploughing in the spring and sowing immediately with both grain and flax. Breaking different depths and at different times of the year.

Experiment No. 2.—'Depth of Ploughing'—Ploughing different depths from three to eight inches. Subsoiling is also done to a depth of four inches both with the three and eight-inch ploughing.

Experiment No. 3.—'Summer-fallow Treatment'—Ploughing at different depths and dates and twice in the same season. Rape on summer-fallow.

Experiment No. 4.—'Burning stubble in the fall and spring'—Ploughing in autumn, in spring and no ploughing, discing at cutting time and in the spring.

Experiment No. 5.—'Seeding to Grasses and Clovers'—Seeding with and without a nurse crop, on stubble, on summer-fallow and after hoed crops.

Experiment No. 6.—'Breaking Sod from Cultivated Grasses'—Somewhat similar to the test with 'Prairie Breaking.'

Experiment No. 7.—'Applying Barnyard Manure'—Applying on stubble, on summer-fallow, in fall, winter and spring.

Experiment No. 8.—'Green Manuring'—ploughing under green crops, peas and tares.

Experiment No. 9.—'Seed Bed Preparation'—Bad, good and extra good.

Experiment No. 10.—'Soil Packers'—Comparing different styles both for fall and spring use.

Experiment No. 11.—'Depth of Seeding'—From one to four inches.

Experiment No. 12.—'Commercial Fertilizers'—Nitrate, phosphate and potash separate and in combination with one another.

Experiment No. 13.—'Underdrainage'—Depth of three and four feet.

On account of the hail storm referred to, the crops were ruined on all of these plots. Such being the case, the only records we have from 1911 are the preparation of the land, seeding, cultivation of the crops, etc., together with the meteorological observations. Although the loss caused by the storm was very unfortunate still the season's work was not thrown away for in many of the experiments it was necessary to have special preparation given to the plot the previous season, such as having stubble land to treat in different ways, root ground on which to sow grain as compared to summer-fallow, etc., etc., all of which are ready for the season of 1912.

ROTATIONS.

The cultural work as just described is a line of investigation to determine the best methods to employ, such as when and how deep to plough, the best methods to follow in summer-fallowing, how to apply manure, etc., etc. The objects of the rotations are somewhat different, they being to determine, if possible, in what order crops should be grown to be not only most profitable but to maintain soil fertility.

Over 55 acres are devoted to the rotations. An acre to an acre and a half is used in each field. Rotations 'A,' 'B' and 'C' are used as a check, for nearly all the land in cultivation up to the present time in southern Alberta is farmed according to one or a combination of all of these rotations. The following is a list of the rotations ('U' and 'V' being on the irrigated portion of the Station, all the others on the non-irrigated part).

Rotation A.—Wheat continuously, year after year.

Rotation B.—First year summer-fallow, second year grain.

Rotation C.—First year summer-fallow, second year grain, third year grain.

Rotation T.—First year summer--fallow, second year wheat, third year oats or barley, fourth year summer--fallow to May, seeded to alfalfa in rows; fifth year alfalfa

hay, sixth year alfalfa hay, seventh year alfalfa hay or pasture, eighth year summer-fallow, ninth year hoed crop, tenth year wheat (manure).

Rotation M.—First year summer-fallow, second year wheat, third year coarse grain (manure), fourth year summer-fallow, fifth year peas and oats for hay, sixth year barley or oats.

Rotation S.—First year summer-fallow, second year hoed crop, third year wheat, fourth year summer-fallow, fifth year wheat, sixth year coarse grain, seventh year summer-fallow (manure), eighth year peas and oats for hay, ninth year rye pasture.

Rotation U.—First year seeding alfalfa, second year alfalfa hay, third year alfalfa hay, fourth year alfalfa hay, fifth year alfalfa hay, sixth year alfalfa hay, seventh year hoed crops, eighth year wheat, ninth year wheat or coarse grain, tenth year coarse grain.

Rotation V.—Alfalfa continuously.

OTHER CROPS.

As has been stated, all the spring grains on the non-irrigated portion of the Station were so badly damaged by the hail that they had to be cut for green feed. The peas were severely injured but there was some crop left. The corn was a sorry sight with the leaves shredded into narrow ribbons. The potato tops were pounded badly but, notwithstanding this the plants managed to produce a very creditable crop under the circumstances. The root crops managed to pull through and give a fair return.

The following results, although the yields are not high, illustrate very well the fact that the farmer who is following methods of diversified farming does not have as much to fear, even from a severe hail storm, as does a straight grain farmer, for it is well to bear in mind that these results are merely salvage, for the storm totally destroyed the grain crop.

Field Peas.—Test of Varieties.

In the case of the field peas, the hail pounded them well into the ground and injured the vines and nearly all of the pods but still left some crop to harvest. The results of the variety test are here given.

Twelve varieties of peas were grown. They were all sown on April 18 on summer-fallowed land in one-sixtieth-acre plots, at the rate of about two to two and one-half bushels per acre, depending on the size of the pea. They were in excellent condition up to the time of the hail storm.

Peas (Non-Irrigated)—Test of Varieties.

Number.	Name of Variety.	Date of Ripening.	Number of days Maturing.	Average Length of Straw.	Average Length of Pod.	Size of Pea.	Yield per Acre.	Yield per Acre.	
				Ins.	Ins.		Lbs.	Bush.	Lbs.
1	Prussian Blue	Aug. 30	134	36	2	Small	1,620	27	....
2	Paragon	" 30	134	34	2	Medium	1,560	26	....
3	Arthur	" 29	133	32	2	"	1,530	25	30
4	Golden Vine	" 30	134	34	2	Small	1,500	25	....
5	Mackay	" 30	134	34	2	Large	1,470	24	30
6	Prince	" 30	134	34	2	"	1,440	24	....
7	English Grey	" 30	134	40	2	Medium	1,410	23	30
8	Chancellor	" 30	134	36	2	Small	1,200	20	....
9	Daniel O'Rourke	" 30	134	30	1¾	"	1,200	20	....
10	Picton	" 30	134	36	1¾	Medium	1,140	19	....
11	White Marrowfat	" 29	133	34	2½	Large	1,140	19	....
12	Black-Eye Marrowfat	" 30	134	36	1¾	"	1,020	17	....

INDIAN CORN—Test of Varieties.

Seven varieties of corn were sown on summer-fallowed land in rows three feet apart on May 27. The crop was cut on September 7 and weighed while still green.

INDIAN CORN FOR ENSILAGE (NON-IRRIGATED)—Test of Varieties.

Number.	Name of Variety.	Average Height.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
		Ins.		Tons.	Lbs.	Tons.	Lbs.
1	Angel of Midnight	58	Tasselled	25	270	8	1,490
2	Compton's Early	58	Well tasselled showing silk	17	760	11	.....
3	Eureka	55	Half tasselled no silk showing	17	650	9	260
4	Superior Fodder	52	Few tassels no silk	16	1,990	5	1,220
5	Selected Leaming	59	Few tassels some silk	14	1,260	8	1,160
6	Longfellow	54	Fairly tasselled some silk	14	50	8	1,490
	North Western Dent	54	Well tasselled small cobs	12	420	7	740

To get satisfactory results with corn, the land should be in a high state of cultivation. A liberal application of well-rotted stable manure is a great help and, to get the best results, it might be said to be a necessity. It is better, if possible, to have this applied the previous season, for it is essential to have it well incorporated with the soil.

Although it is difficult in an average season to have the crop sufficiently matured to make ensilage of high feeding value, still it is a crop that deserves more attention than is usually given it here, for it has a special value when used as a soiling crop. The farmer who is keeping milch cows will find a few acres of corn, well taken care of, a great aid in keeping up the milk supply during August and the early part of September, when the pastures are dry. By having the corn growing conveniently near his barn or corrall, he can cut some each day to feed at night without a great deal of extra labour and he will be certain to be more than pleased by the increased flow of milk.

TURNIPS.

Although turnips respond to good cultivation in that they delight in well-prepared land especially if an application of well-rotted manure has been given long enough before to allow it to be well worked into the land, still, they are a crop that often does wonderfully well on fresh-broken sod. This is a point that should be born in mind by the new homesteader who has nothing but sod land the first year.

TURNIPS—TEST OF VARIETIES.

Ten varieties of turnips were tested. They were planted on summer-fallowed land in rows thirty inches apart on May 27 and the plants were thinned to about one foot apart. The roots were pulled November 4.

TURNIPS (non-irrigated)—Test of Varieties.

Number.	Name of Variety.	Size of Plot.	Sown.	Pulled.	Yield per Acre.	
		Acres.			Tons.	Lbs.
1	Magnum Bonum	1/145	May 27	Nov. 4	18	154
2	Hall's Westbury	1/99	" 27	" 4	17	1,734
3	Halewood's Bronze Top	1/108	" 27	" 4	17	967
4	Good Luck	1/108	" 27	" 4	17	97
5	Jumbo	1/132	" 27	" 4	15	1,416
6	Mammoth Clyde	1/171	" 27	" 4	15	1,260
7	Hartley's Bronze Top	1/99	" 27	" 4	15	1,205
8	Bangholm Selected	1/138	" 27	" 4	14	349
9	Carter's Elephant	1/129	" 27	" 4	12	134
10	Perfection Swede	1/89	" 27	" 4	6	151

MANGELS.

Eight varieties of mangels were tested. The seed was sown on summer-fallowed land on May 4 in rows thirty inches apart. The plants were thinned to about one foot apart. They were dug October 5.

MANGELS (non-irrigated)—Test of Varieties.

Number.	Name of Variety.	Size of Plot.	Sown.	Pulled.	Yield per Acre.	
		Acres.			Tons.	Lbs.
1	Giant Yellow Intermediate	1/223	May 4	Oct. 5	18	1,528
2	Prize Mammoth Long Red	1/223	" 4	" 5	16	1,507
3	Yellow Intermediate	1/223	" 4	" 5	16	1,283
4	Giant Yellow Globe	1/223	" 4	" 5	16	837
5	Selected Yellow Globe	1/129	" 4	" 5	14	1,684
6	Perfection Mammoth Long Red	1/145	" 4	" 5	14	1,430
7	Gate Post	1/145	" 4	" 5	14	604
8	Half Sugar White	1/129	" 4	" 5	12	1,812

CARROTS.

Three varieties of carrots were tested. They were sown on summer-fallowed land on May 3 in rows twenty inches apart and the plants were thinned to about four to six inches apart. They were dug October 20.

CARROTS (non-irrigated)—Test of Varieties.

Number.	Name of Variety.	Yield per Acre.	
		Tons.	Lbs.
1	White Belgian	13	1,545
2	Improved Short White	10	1,432
3	Ontario Champion	9	1,607

SUGAR BEETS.

Three varieties of sugar beets were tested. The seed was sown on summer-fallowed land on May 3 in rows twenty inches apart and the plants were thinned to about six to seven inches apart in the rows. They were dug October 20.

SUGAR BEETS (Non-irrigated)—Test of Varieties.

Number.	Name of Variety.	Size of Plot.	Sown.	Pulled.	Yield per Acre.	
		Acres.			Tons.	Lbs.
1	Klein Wanzleben	1/218	May 3	Oct. 20	12	829
2	Vilmorin's Improved	1/301	" 3	" 20	12	33
3	French Very Rich	1/218	" 3	" 20	9	1,820

POTATOES.—TEST OF VARIETIES.

Considering the severe pounding that the potato vines were subjected to by the hail storm, the yields obtained are somewhat remarkable. Eighteen varieties were tested. They were put in on summer-fallowed land. For planting, medium-sized potatoes were selected, the seed end was pared off and the potato was divided into four or six pieces depending on its size. They were planted on May 28 in rows thirty inches apart and the sets were placed about one foot apart in the rows. They were dug October 13.

POTATOES (Non-irrigated)—Test of Varieties.

Number.	Variety.	Yield per Acre.		Yield per Acre Marketable.		Yield per Acre Unmarketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
1	Ashleaf Kidney	426	48	396	..	30	48	Oval, white.
2	Carman No. 1	422	24	400	24	22	..	Flat, white.
3	Morgan Seedling	404	48	374	..	30	48	Long, pink.
4	American Wonder	393	48	374	..	19	48	Long, white.
5	Dreer's Standard	393	48	363	..	30	48	Oval, white.
6	Rochester Rose	385	..	343	12	41	48	Long, pink.
7	Factor	385	..	343	12	41	48	White.
8	Dalmeny Beauty	374	..	319	..	55	..	Oval, white.
9	Reeves' Rose	371	48	336	36	35	12	Long, pink.
10	Empire State	360	48	334	24	26	24	Long, white.
11	Irish Cobbler	356	24	330	..	26	24	Flat, white.
12	Gold Coin	356	24	319	..	37	24	Round, white.
13	Late Puritan	345	24	327	48	17	36	Long, pink.
14	Money Maker	327	48	316	48	11	..	Round, white.
15	Everett	325	36	301	24	24	12	Long, pink.
16	Vick's Extra Early	312	24	279	24	33	..	Flat, white.
17	Early Ohio	286	..	242	..	44	..	Pink.
18	Hard-to-Beat	244	12	222	12	22	..	White.

POTATOES FROM IRRIGATED LAND VS. SEED FROM NON-IRRIGATED LAND.

The question is often asked by the dry land farmer as to whether seed potatoes grown on dry land are not better for him to use than seed grown on irrigated land. To get information along this line, the following test was carried out.

Three rows, each 156 feet long, rows thirty inches apart, were planted with Gold Coin potatoes grown on non-irrigated land the previous season. Alongside, three more rows the same length were planted with seed grown on irrigated land the season previous.

	Total Yield per Acre.		Yield per Acre Marketable.	
	Bush.	Lbs.	Bush.	Lbs.
Seed from irrigated land	418	50	406	25
Seed from non-irrigated land	412	38	397	7

This test was repeated on irrigated portion of the Station but the results were reversed, that is, dry land seed when planted on irrigated land produced a larger crop than did seed from irrigated land planted on irrigated land.

POTATOES PLANTED AT DIFFERENT DISTANCES APART.

Potatoes were planted in rows 2½, 3, 3½ and 4 feet apart and the sets were put on one half the rows two feet apart and on the other half one foot apart. The following results were obtained:—

Distance Apart of Rows.	Amount of Seed per Acre.		Yield per Acre.									
			Sets put 2 feet Apart.						Sets put 1 foot Apart.			
			Yield 1911.				Average for 2 Years		Yield 1911.				Average for 2 Years	
	Sets put 2 feet Apart.	Sets put 1 foot Apart.	Marketable.		Total.				Marketable.		Total.			
Feet.	Lbs.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
2½	705	1,410	384	20	398	34	255	58	437	..	468	19	289	51
3	587	1,174	294	10	303	40	208	44	367	43	393	48	250	15
3½	503	1,006	264	20	270	26	187	17	366	..	386	20	238	22
4	440	880	237	32	245	32	170	13	358	32	367	26	229	38

A careful study of the above table indicates that when the sets are put two feet apart, a relatively larger return is obtained from the same amount of seed used than when the sets are put one foot apart, or expressed in another way, if one has a limited amount of seed, the sets should be placed farther apart in the row than one foot to get the best returns but, if one has a limited amount of land, a larger yield per acre can be obtained by putting the sets one foot apart rather than two feet.

FORAGE CROPS.

There is perhaps no work carried on at the Station that is watched with more interest by many of the farmers than the work with forage crops, particularly alfalfa. On the dry land, the hail storm unfortunately destroyed any results that we otherwise would have obtained.

Notwithstanding the very dry season of 1910, all of our alfalfa fields came through the winter and were, in the spring of 1911, in good, thrifty condition as were also some plots of western rye and brome grass. Timothy and clover, however, appeared to have succumbed on account of the unusually dry conditions during 1910.

As a result of the dry period mentioned above which prevailed during the latter part of May and the first part of June, the first cutting of alfalfa was very light and came into bloom when much of it was only a few inches high. This was cut as soon as the blooms appeared but the yields were in all cases less than one-half a ton to the acre. The rains during the latter part of June and during July brought the second growth on in excellent condition so that the second cutting would have been quite profitable had not the hail storm destroyed it.

The field of alfalfa planted in rows for the propagation of seed was loaded nicely and a fair crop of seed was looked for but this too was, of course, destroyed.

APPLE ORCHARD AND SMALL FRUITS.

The apple trees came through the winter in very good condition, there being but a relatively small amount of the previous season's growth killed back. There were no blooms, except in one or two isolated cases on the cross-bred apple trees, and no fruit set.

The currants and raspberries wintered well but there was practically no fruit on the currants and the raspberries produced but a small amount. The very dry season of 1910 was not conducive to a very vigorous growth. To carry raspberry canes through the winter, they must be protected by being laid down and covered with earth in late autumn.

PART II.—THE IRRIGATED FARM.

The crops on the irrigated portion of the Station were all more or less injured by the hail storm, but not nearly to the extent that they were on the non-irrigated portion, as only the outer fringe of the storm reached them.

SPRING WHEAT.—TEST OF VARIETIES.

Five varieties of spring wheat were tested. They were sown April 15 at the rate of one bushel and one peck per acre, on potato land, in plots of one-sixtieth acre each. They were irrigated once on June 23.

SPRING WHEAT—Test of Varieties (irrigated).

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a Scale of 10 Points.	Average Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	
					Ins.		Ins.		Lbs.	Bush.	Lbs.
1	Huron	April 15	Sept. 1	139	46	10	3½	Bearded.	3,473	55	45
2	Marquis	" 15	Aug. 31	138	42	10	3½	Bald.	4,157	55	43
3	Red Fife	" 15	" 31	138	44	10	3	"	2,400	55	..
4	Preston	" 15	" 31	138	46	10	3½	Bearded.	4,230	49	30
5	Stanley	" 15	" 31	138	48	10	3½	Bald.	4,995	44	45

RATES OF SEED PER ACRE.

In this experiment, Red Fife wheat was used in the four years that it has been carried on. The grain was sown this season, as has usually been the case in previous years, on summer-fallowed land. The grain was irrigated on June 23.

SPRING WHEAT—Rates of Seed per Acre (irrigated).

Rate of Seed per Acre.	Date Ripe.	Yield per Acre in 1911.		Average Yield for 4 Years.	
		Bush.	Lbs.	Bush.	Lbs.
15 lbs.	Sept. 9	28	..	28	30
30 "	" 9	50	40	34	44
45 "	" 9	51	40	36	23
60 "	" 1	51	..	36	50
75 "	" 1	52	20	40	5
90 "	Aug. 31	53	..	40	58
105 "	" 30	51	40	43	17
120 "	" 30	52	20	39	18

As will be noted from the column giving the average yields for four years, 105 pounds of seed per acre gives the largest yield. This is of importance to farmers on irrigated land in southern Alberta, for the usual practice is to sow much less than this amount.

FIELD LOTS OF SPRING WHEAT.

On rotation 'U,' the one-acre field yielded 26½ bushels of wheat. As this is the first year the rotation has been under way, the yield has no particular value. It might be of interest to note that the cost to produce this one acre including threshing and a charge of $3 for rent of land amounted to $11.12, leaving a profit of $12.73 per acre with wheat at 90 cents per bushel.

A field of 1·8 acres of Bobs wheat was grown on summer-fallowed land adjacent to the irrigated portion of the Station on land that had been summer-fallowed two seasons in succession, but the crop was not irrigated. It yielded at the rate of 36 bushels per acre.

EXPERIMENTS WITH OATS—TEST OF VARIETIES.

Five varieties of oats were tested. They were sown on April 17, at the rate of about eighty-five pounds per acre in one-sixtieth-acre plots on potato land. One irrigation was given on June 23.

OATS—Test of Varieties (irrigated).

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a Scale of 10 Points.	Average Length of Head.	Weight of Straw.	Yield per Acre.	
				Ins.		Ins.	Lbs.	Bush.	Lbs.
1	Abundance	Aug. 25	130	46	9	7	5,220	90	..
2	Banner	" 24	129	46	10	7½	4,320	84	24
3	Danish Island	" 24	129	45	10	7½	4,320	84	24
4	Improved American	" 24	129	46	10	7½	4,260	82	32
5	Irish Victor	" 24	129	48	10	7½	4,080	79	14

From a four years' test, it would appear that Abundance and Banner stay at the top of the list with practically the same average yield, so that a farmer will make no mistake in using either one of these varieties.

OATS—RATES OF SEED PER ACRE.

The crop was sown on land on which potatoes were grown the previous season and was irrigated once on June 23.

OATS—Rates of Seed per Acre (irrigated).

Rate of Seed per Acre.	Date Ripe.	Yield per Acre in 1911.		Average Yield for 4 Years.	
		Bush.	Lbs.	Bush.	Lbs.
15 lbs.	Sept. 1	58	8	66	12
30 "	Aug. 30	80	20	70	23
45 "	" 30	88	8	72	27
60 "	" 30	93	18	79	21
75 "	" 30	92	12	81	15
90 "	" 30	95	30	84	33
105 "	" 25	80	.	82	7
120 "	" 24	76	16	78	13

The average results for four years indicate that 90 pounds of seed per acre, or about 2¾ bushels, is not far from the best quantity of oats to sow on irrigated land.

FIELD LOTS OF OATS.

There were two acres of oats in rotation 'U' that yielded at the rate of 55 bushels per acre. The cost per acre to produce the crop, including threshing and $3 per acre for rent, was $11.36 per acre.

A field of 13 02 acres was sown on summer-fallowed land. It received one irrigation and yielded at the rate of 80 bushels and 19 pounds per acre.

EXPERIMENTS WITH BARLEY.

Six varieties of six-row and four varieties of two-row barley were tested. They were sown on potato land on one-sixtieth-acre plots on May 1 and 2, at the rate of about 85 pounds per acre. One irrigation was given on June 23. As the varieties were all about ripe at the time of the hail storm, they were naturally injured a good deal thereby.

SIX-ROWED BARLEY—Test of Varieties (irrigated).

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a Scale of 10 Points.	Average Length of Head.	Weight of Straw.	Yield per Acre.	
				In.		In.	Lbs.	Bush.	Lbs.
1	Claude	Aug. 16	107	36	8	2½	3,180	81	12
2	O. A. C. No. 21	" 17	107	39	9	2⅝	5,760	73	36
3	Odessa	" 23	114	35	6	2¼	2,880	65	..
4	Mansfield	" 16	107	37	9	2½	2,940	61	12
5	Mensury	" 23	114	38	8	2¾	2,940	51	12
6	Manchurian	" 23	113	45	7	3	3,730	41	43

TWO-ROWED BARLEY—Test of Varieties (irrigated).

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a Scale of 10 Points.	Average Length of Head.	Weight of Straw.	Yield per Acre.	
				In		In	Lbs.	Bush.	Lbs.
1	Swedish Chevalier	Aug. 23..	114	36	2	3	4,920	70	..
2	Standwell	" 23..	114	36	4	2¼	4,620	63	36
3	Invincible	" 23..	114	38	5	2¼	4,680	62	24
4	Clifford	" 18..	109	46	10	3½	6,300	41	12

BARLEY—RATES OF SEED PER ACRE.

Mensury barley was used and it was sown April 21, on potato ground. One irrigation was given on June 23. There was a severe wind storm soon after this barley came up that blew sand across the field and cut nearly all the small plants off close to the ground so that maturity was doubtless delayed and the yield reduced somewhat.

BARLEY—Rates of Seed per Acre (irrigated).

Rate of Seed per Acre.	Date Ripe.	Yield in 1911.		Average Yield for 4 Years.	
		Bush.	Lbs.	Bush.	Lbs.
15 lbs	Aug. 23..	24	8	32	14
30 "	" 16..	50	..	40	30
45 "	" 15..	51	12	44	8
60 "	" 15..	56	12	46	42
75 "	" 15..	47	44	41	26
90 "	" 15..	55	..	42	32
105 "	" 15..	38	36	34	42
120 "	" 15..	37	4	36	47

As in the case of oats, 90 pounds of seed per acre has given the best returns for the last four years.

EXPERIMENTS WITH PEAS—TEST OF VARIETIES.

Twelve varieties of peas were tested. They were sown in one-sixtieth-acre plots, on summer-fallowed land, on April 17, at the rate of about two to two and one-half bushels per acre, deepening on the size of the pea. They were given one irrigation on June 23.

PEAS.—Test of Varieties—(Irrigated).

Number.	Name of Variety.	Date of Ripening.	Number of Days Maturing.	Average Length of Straw.	Average Length of Pod.	Size of Pea.	Yield per Acre.	Yield per Acre.	
				Inches.	Inches.		Lbs.	Bush.	Lbs.
1	Paragon	Aug. 31..	136	48	2¼	Large	3,000	50	..
2	Prince	" 31..	136	48	2	"	2,760	46	..
3	Prussian Blue	" 31..	136	44	2¼	Medium	2,760	46	..
4	English Grey	" 31..	136	48	2	"	2,640	44	..
5	Mackay	" 31..	136	46	2	"	2,640	44	..
6	Picton	" 31..	136	48	2¼	Large	2,325	38	45
7	Black-Eye Marrowfat	" 31..	136	48	2¼	"	2,280	38	..
8	Arthur	" 31..	136	42	2	Medium	2,220	37	..
9	Chancellor	" 29..	134	46	2	"	2,160	36	..
10	Golden Vine	" 31..	136	43	2	Small	2,040	34	..
11	White Marrowfat	" 31..	136	54	2¼	Large	2,040	34	..
12	Daniel O'Rourke	" 31..	136	48	2	Small	1,500	25	..

EXPERIMENTS WITH INDIAN CORN—TEST OF VARIETIES.

Seven varieties of corn were sown for ensilage in rows three feet apart on May 27. In each case, part was planted in hills three feet apart and part in rows, the plants being thinned out to about ten inches apart in the rows. The crop was cut on September 7 and weighed while still green. It was irrigated once on July 24.

INDIAN CORN FOR ENSILAGE—Test of Varieties (irrigated).

Number.	Name of Variety.	Average Height.	Condition when Cut.	Weight per Acre Grown in Rows.		Weight per Acre Grown in Hills.	
		In.		Tons.	Lbs.	Tons.	Lbs.
1	Superior Fodder	59	No tassels	21	....	10	1,280
2	Selected Leaming	67	Just tasselling, no silk	17	560	12	1,600
3	Angel of Midnight	71	Tasselled, large per cent. of silk	17	560	11	1,560
4	Eureka	65	Few tassels	16	1,920	10	1,840
5	Longfellow	60	Some tasselled, some silk	15	800	8	160
6	Northwestern Dent	61	Some cobs	13	.. .	8	720
7	Compton's Early	70	Tasselled, few silks	12	720	9	1,520

As mentioned earlier in this report, corn is a crop of a great deal of value to the dairy farmer, for it gives him something of a green, succulent nature to cut and feed to his cows during August and September at a time when his milk supply will fall off rapidly unless he does something of this kind.

FIELD ROOTS.

Too little attention is being paid to the growing of roots for stock feed by the farmers on irrigated land in Southern Alberta. On account of our short growing season, it is always going to be difficult to get a variety of corn that will produce a large quantity of fodder sufficiently matured to make good ensilage, but our climate and soil are peculiarly adapted to the growing of roots and these, when fed in conjunction with alfalfa hay, make an ideal food for milch cows or for the growing and fattening of stock of all kinds.

Preparation of the land.—The land on which the varietal tests were conducted had been in potatoes the year previous. The field was ploughed in the spring and packed. All of the roots were irrigated but once, on July 24.

EXPERIMENTS WITH TURNIPS—TEST OF VARIETIES.

Ten varieties of turnips were tested. They were planted in rows thirty inches apart, on May 27, and the plants were thinned to about one foot apart. The roots were pulled November 4.

TURNIPS (irrigated)—Test of Varieties.

Number.	Name of Variety.	Size of Plot.	Pulled.	Yield per Acre.	
		Acres.		Tons.	Lbs.
1	Hall's Westbury	1/100	November 4....	26	...
2	Halewood's Bronze Top	1/100	" 4 ..	24	500
3	Mammoth Clyde	1/100	" 4....	24	....
4	Bangholm Selected	1/124	" 4 ...	23	1,917
5	Good Luck	1/100	" 4....	22	1,500
6	Magnum Bonum	1/100	" 4....	22	1,500
7	Hartley's Bronze Top	1/100	" 4....	21	500
8	Perfection Swede	1/100	" 4....	20	1,500
9	Jumbo	1/100	" 4....	19	1,000
10	Carter's Elephant	1/100	" 4...	19	500

EXPERIMENTS WITH MANGELS—TEST OF VARIETIES.

Eight varieties of mangels were tested. The seed was sown May 2 and again on May 17 in rows thirty inches apart. The plants were thinned to about one foot apart. They were dug October 4.

MANGELS (irrigated)—Test of Varieties.

Number.	Name of Variety.	Size of Plot.	Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.	
		Acres.	Tons.	Lbs.	Tons.	Lbs.
1	Giant Yellow Globe	1/100	22	700	18	...
2	Perfection Mammoth Long Red	1/100	22	350	19	1,500
3	Selected Yellow Globe	1/100	21	1,800	19	1,600
4	Prize Mammoth Long Red	1/100	21	700	17	1,700
5	Giant Yellow Intermediate	1/100	19	1,600	14	1,700
6	Half Sugar White	1/100	19	900	18	1,100
7	Gate Post	1/100	18	800	18	300
8	Yellow Intermediate	1/100	17	1,000	16	1,200

EXPERIMENTS WITH CARROTS—TEST OF VARIETIES.

Five varieties of carrots were tested. They were sown May 2 in rows twenty inches apart and the plants were thinned to about four to six inches apart. They were dug October 20.

CARROTS (irrigated)—Test of Varieties.

Number.	Name of Variety.	Yield per Acre.	
		Tons.	Lbs.
1	White Belgian	22	1,293
2	Half Long Chantenay	20	540
3	Ontario Champion	19	1,947
4	Mammoth White Intermediate	19	1,947
5	Half Short White	13	730

EXPERIMENTS WITH SUGAR BEETS—TEST OF VARIETIES.

Three varieties of sugar beets were tested. The seed was sown May 2 in rows twenty inches apart and the plants were thinned to about six to seven inches apart in the rows. They were dug October 20.

SUGAR BEETS (irrigated)—Test of Varieties.

Number.	Name of Variety.	Size of Plot.	Sown.	Pulled.	Yield per Acre.	
		Acres.			Tons.	Lbs.
1	Vilmorin's Improved	1/148	May 2	Oct. 20	20	837
2	Klein Wanzleben	1/148	" 2	" 20	15	1,631
3	French Very Rich	1/148	" 2	" 20	13	1,473

EXPERIMENTS WITH POTATOES.

The season proved to be a favourable one for potatoes and the hail storm did not appear to affect the yield materially. Some general observations in regard to the culture of potatoes on irrigated land with special reference to their irrigation were given in last year's report, so that it will not be necessary to repeat anything of a similar nature here.

TEST OF VARIETIES.

Eighteen varieties were tested. They were all planted on May 25 in rows thirty inches apart and the sets were planted about one foot apart in the row. The seed was cut the same as in the non-irrigated test. They were irrigated twice on July 24 and July 29.

POTATOES (irrigated)—Test of Varieties.

Number.	Variety.	Yield per Acre.		Yield per Acre Marketable.		Yield per Acre Unmarketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
1	Gold Coin	568	20	546	40	21	40	Round, white.
2	Irish Cobbler	560	..	528	20	31	40	Flat, white.
3	Morgan Seedling	533	20	510	..	23	20	Long, pink.
4	Empire State	518	20	501	40	16	40	Long, white.
5	Carman No. 1	483	20	468	20	15	..	Flat, white.
6	Dalmeny Beauty	483	20	456	40	26	40	Oval, white.
7	Rochester Rose	471	40	441	40	30	..	Long, pink.
8	American Wonder	459	48	444	24	15	24	Long, white.
9	Reeves' Rose	455	..	416	40	38	20	Long, pink.
10	Dreer's Standard	428	20	405	..	23	20	Oval, white.
11	Everett	423	20	381	40	41	40	Long, pink.
12	Late Puritan	420	..	400	..	20	..	" "
13	Vick's Extra Early	400	..	383	20	16	40	Flat, white.
14	Ashleaf Kidney	396	40	373	20	23	20	Oval, white.
15	Factor	383	20	355	..	28	20	White.
16	Money Maker	366	40	353	20	13	20	Round, white.
17	Early Ohio	361	40	336	40	25	..	Pink.
18	Hard-to-Beat	240	..	223	20	16	40	White.

FIELD LOTS OF POTATOES.

An acre of potatoes was grown in rotation 'U' and, although this is the first year that the rotation has been under way, the results obtained are of sufficient interest to be worth reporting.

Nine and a half tons of manure was applied in the spring and ploughed under. The potatoes were planted May 26. As we did not have a sufficient quantity of seed of any one variety, four kinds were planted, namely, Irish Cobbler, Early Ohio, Rochester Rose and Gold Coin. A horse cultivator was used four times during the summer. They were irrigated once on July 25.

The total cost of producing the crop, including a charge of $3 for rent, amounted to $52.79; the total value of the crop at $23 per ton, which was the wholesale price in November, was $314.18, leaving a net profit of $261.39.

POTATOES FROM IRRIGATED LAND VS. SEED FROM NON-IRRIGATED LAND.

——	Total Yield per Acre.		Yield per Acre Marketable.	
	Bush.	Lbs.	Bush.	Lbs.
Seed from non-irrigated land	587	53	564	33
Seed from irrigated land	457	52	430	5

FORAGE CROPS.

ALFALFA—IRRIGATED.

Of all the crops that can be profitably grown on irrigated land in Southern Alberta there is none that is of greater importance than alfalfa. Alfalfa-growing is no longer in the experimental stage here. It has been now grown in the Lethbridge district for eleven years and there is at the present time about 6,000 acres seeded down. No winter-killing worth mentioning has been reported in the district. In other portions of the southern part of the province, there have been a large number of experimental fields put in which have in most cases been successful. Indications, however, point to the fact that care must be exercised in the selection of the seed. The Grimm is probably the hardiest variety found so far, but pure seed of this strain is difficult to obtain. The Turkestan is also a good variety. Seed grown in the northern part of Montana will probably prove quite satisfactory. It is to be hoped that it will be found possible to grow seed commercially in the province so that in time the local demand may be supplied, in part at least, in this way.

A bulletin dealing with alfalfa growing in Alberta has been prepared by Mr. G. H. Hutton, Superintendent, Experimental Station, Lacombe, and the writer of this report. A copy of it may be had by applying to the Experimental Station either here or at Lacombe, Alta.

The yields obtained this year have been the lightest since the Station was established. There are two reasons; there was a light hail storm in June just before the first cutting was made that injured the crop somewhat by breaking some of the slender growth off and there was more rain than is ordinarily the case in July and August. The weather during this period was cooler than usual, consequently the growth of the alfalfa was not as rank as it would otherwise have been.

ALFALFA—RATES OF SEED PER ACRE.

In the spring of 1908, plots of one-fourth acre each were planted with alfalfa and the yields of these during 1911 are here given as well as the average yield for the past three years. It should be stated that the weather conditions were favourable at the time these plots were planted and an excellent stand was obtained, in fact, better than one could ordinarily count on, consequently the good yields from the light seeding.

ALFALFA—Rates of Seed per Acre (irrigated).

Rate of Seed.	First Cutting.		Second Cutting.		Third Cutting.		Total for Season.	
	Yield in 1911.	Average for 3 Years.	Yield in 1911.	Average for 3 Years.	Yield in 1911.	Average for 3 Years.	Yield in 1911.	Average for 3 Years.
Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.
5	1 1,000	1 1,520	1 1,720	2 347	– 1,920	1 406	4 640	5 273
10	1 860	1 1,913	2 60	2 727	– 1,980	1 793	4 900	5 1,333
15	1 680	1 1,986	2 40	2 647	– 1,800	1 793	4 520	5 1,426
20	1 620	1 1,846	2 200	2 747	– 1,820	1 627	4 640	5 1,220
25	1 560	1 1,640	1 1,960	2 613	– 1,705	1 622	4 225	5 875
30	1 960	1 1,920	2 300	2 713	– 1,680	1 760	4 940	5 1,394

FIELD LOTS OF ALFALFA (irrigated).

Area.	First Cutting.		Second Cutting.		Third Cutting.		Total Yield per Acre.	
	Date Cut.	Yield per Acre.	Date Cut.	Yield per Acre.	Date Cut.	Yield per Acre.		
Acres.		Tons Lbs.		Tons Lbs.		Tons Lbs.	Tons	Lbs.
2.8	June 19	1 660	August 12	1 1,815	Sept. 27	.. 1,275	3	1,750
3½	" 19	1 1,165	" 14	1 1,877	" 28	.. 1,019	4	61
0·89	" 29	2 1,034	" 11	1 1,753	" 27	.. 1,286	5	73

MIXTURE OF GRASSES AND ALFALFA.

Where alfalfa is sown with a mixture of grasses such as timothy, rye grass, etc., the hay can be cut only twice during the season instead of three times, owing to the fact that the grasses are not ready to cut until some time in July, which allows time for only one more cutting to come on, while alfalfa, when grown alone, must be cut the first time about June 25 if three cuttings are desired. After the grasses have been cut in July, they make little growth, so that the second cutting is practically pure alfalfa. The following table gives the results of four plots of one-quarter of an acre each, sown in 1908, and also one field of 5·3 acres of alfalfa and timothy sown in 1910.

MIXTURES OF GRASSES AND ALFALFA.

	First Cutting.				Second Cutting.				Total for Season.			
	Yield in 1911.		Average for Three Years.		Yield in 1911.		Average for Three Years.		Yield in 1911.		Average for Three Years.	
	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.
Alfalfa and brome grass	1	1,720	2	1,200*	1	1,120	2	480*	3	840	4	1,680*
Alfalfa and timothy	2	1,120	2	1,207	1	880	1	1,733	4	..	4	940
Alfalfa and rye grass	2	160	2	1,253	1	1,320	2	293	3	1,480	4	1,546
Alfalfa, brome, timothy and rye grass	2	580	2	1,467	1	1,200	2	506	3	1,780	4	1,973
Alfalfa and timothy	1	1,905	.....		1	240	.....		3	145	.....	

* Average yield per acre for two years only.

VARIETIES OF ALFALFA.

In the spring of 1909, seed of fourteen varieties or strains of alfalfa were planted that were received from the United States Department of Agriculture, Washington, D.C. These were supplied by the courtesy of Mr. J. M. Westgate, Agronomist, Division of Forage Crop Investigations. The following table gives the results for the past season:—

Size of Plot.	Name and Number.	First Cutting. Yield per acre.		Second Cutting. Yield per acre.		Third Cutting. Yield per acre.		Total for Season. Yield per acre.	
Acres		Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.
1·10	25102 Grimm	2	950	2	750	..	1,400	5	1,100
1·10	21032 Turkestan	2	750	2	150	..	1,380	5	280
1·10	23454 Montana	2	1,650	2	550	..	1,670	5	1,870
1·10	23396 Sand Lucerne	2	850	1	1,850	..	1,580	5	280
1·10	23394 Sand Lucerne	3	1,150	2	400	1	100	5	1,650
1·10	24836 Canadian (Purple Flowers)	2	600	2	150	..	1,800	5	550
1·10	24859 Kansas Hardy	3	400	2	1,550	..	1,980	6	1,930
1·10	24837 Canadian (Variegated)	2	1,450	2	1,700	..	1,940	6	1,090
1·10	Turkestan from Ottawa	3	1,000	2	400	..	1,000	6	400
1·40	25022 Old Frankish Lucerne	2	1,000	1	1,280	..	1,760	5	40
1·40	22789 From Tschimkent, Turkestan (Average winters)	2	1,600	2	880		1,160	5	1,040
1·40	22790 From Khiva, Turkestan, (Mild winters)	2	1,600	2	.....		1,240	5	840
1·40	23203 From Werny, Turkestan, (Very severe winters)	3	.....	2	1,400		1,240	6	640
1·40	22788 From Aulieata, Turkestan, (Severe winters)	3	.....	1	1,800		1,240	5	1,040

NEW SEEDING.

There was about eight acres more land seeded down to alfalfa in 1911.

TIMOTHY AND CLOVER.

A field of a little less than one acre (0·96) was sown in 1910. It was irrigated twice during the summer.

—	Date Cut.	Yield per Acre. Tons	Lbs.
First Cutting	July 10	1	1,820
Second Cutting	Sept. 9	1	1,415
Total for season		3	1,235

TIMOTHY.

A field of one-quarter of an acre of timothy was cut July 13 and yielded at the rate of 2 tons and 600 pounds per acre. A second growth came on which was cut on August 14 but only yielded at the rate of 920 pounds per acre.

BROME GRASS *(Bromus inermis).*

A field of one-half acre of this hay was sown in 1908. It was cut this year on July 10 and yielded at the rate of 2 tons and 70 pounds per acre. Some second growth came on but was not cut.

WESTERN RYE GRASS *(Agropyrum tenerum).*

A field of one-half an acre of this hay was cut July 13 and yielded at the rate of 2 tons and 460 pounds per acre.

SHEEP FEEDING EXPERIMENT.

A feeding experiment was inaugurated with wether lambs for the purpose of gaining information on the relative values of alfalfa when fed alone and in different combinations with roots and grains and also to try to provide a market for alfalfa which would prove to be more profitable to the farmer than pressing and shipping it, and lastly to determine whether or not it be possible to carry the surplus stock from the fall through the winter with a profit till such time as the market price for mutton is firmer and higher than in the fall months.

OUTLINE OF EXPERIMENT.

Two hundred and fifty wether range lambs were purchased in October for $3 per head for tops, from Mr. Jos. A. Young, of Lethbridge. These lambs were delivered at the Station before the end of October and were run on the stubble until November 20, at which time they were brought in and divided into five lots of 50 each and put into yards 100 feet by 25 feet with sheds at the end of each, 12 feet by 25 feet. The different manner in which the five lots were fed is as follows:—

Group 1.—Alfalfa and mixed grains.
Group 2.—Alfalfa and screenings.
Group 3.—Alfalfa, roots and mixed grains.
Group 4.—Alfalfa and roots.
Group 5.—Alfalfa alone.

Lots four and five to be fed mixed grains for the last five or six weeks of the experiment to finish and harden them sufficiently for shipping. For two weeks after being shut in these yards, each lot received hay only.

In lots 1 and 3 it was planned at first to work the amount of meal up gradually until a pound per lamb per day was reached, but this idea was abandoned soon after starting the experiment, and it was decided that they should be gradually worked up to whatever they would eat up clean, which proved to be approximately two pounds per lamb per day. On account of having only a limited amount of roots, the lambs never got more than three pounds each per day and usually about two pounds. The bunch fed screenings were given all they would eat up which was something less than two pounds per lamb per day. The groups getting meal and roots would take fully as much meal as the group that got only meal.

TABLE SHOWING AMOUNT OF FEED CONSUMED.

—	Lot 1.	Lot 2.	Lot 3.	Lot 4.	Lot 5.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total amount of hay consumed	11,959	12,204	11,599	13,209	13,714
Average amount of hay consumed per lot per day	106	109	103	118	122
Average amount of hay consumed per lamb per day	2·16	2·18	2·10	2·40	2·49
Total amount of meal eaten by lot for period	6,062		6,062	2,200	2,200
Average amount of meal eaten per lot per day	54		54	*52	*52
Average amount of meal eaten per lamb per day	1·10		1·10	*1·06	*1·06
Total amount of screenings eaten by lot for period		5,082			
Average amount of screenings eaten by lot per day		45			
Average amount of screenings eaten per lamb p. day		·9			
Total amount of roots eaten by lot for period			9,985	9,985	
Average amount of roots eaten by lot per day			89	89	
Average amount of roots eaten per lamb per day			1.81	1·81	

* Fed meal during the last six weeks only.

Water was kept before them regularly throughout the day. The two hundred and fifty sheep on an average consumed fifty pails of water per day. A supply of rock salt was kept in each yard. Care was exercised in keeping the pens dry and the floors well covered with straw to insure thorough comfort for the sheep.

FEEDS.

In calculating the cost of feeding, the following prices were charged:—

—	Price per Ton.
Roots (Turnips)	$ 2 50
Meal mixture (2 oats, 2 wheat, and 1 bran)	20 00
Alfalfa hay	10 00
Screenings	5 00

The meal mixture was made up of two parts of oats (ground), two parts of injured wheat and one part of bran. The screenings are valued at $5 per ton which is rather high for the average elevator screenings but it was not too high for the grade we fed, taking them all through. In feeding screenings, it is advisable to buy the full quantity that will probably be required to put the stock through that are being fed, so that the animals receive feed from day to day of a quality that is uniform. This they do not do in cases where screenings of varying quality are fed, as they come from the elevator from time to time.

TABLE OF WEIGHTS AND GAINS.

Date of Weighing.	Lot 1		Lot 2		Lot 3		Lot 4		Lot 5	
	Total Weight by lot	Gain per lamb per day	Total Weight by lot	Gain per lamb per day	Total Weight by lot	Gain per lamb per day	Total Weight by lot	Gain per lamb per day	Total Weight by lot	Gain per lamb per day
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
November 21, 1911	3,969	.....	3,923	.....	3,907	.....	3,928	.....	3,967	.....
December 5, 1911	4,080	·16	4,091	·24	4,125	·31	4,197	·38	4,036	·09
December 19, 1911	4,180	·14	4,175	·12	4,211	·12	*4,145	·04	4,087	·58
December 26, 1911	4,537	1·02	4,544	1·05	4,586	1·07	4,334	·55	4,390	·86
January 17, 1912	4,565	·03	4,530	—·01	4,720	·13	4,345	·01	4,322	—·06
January 30, 1912	4,650	·12	4,670	·2	4,905	·26	4,310	—·05	4,090	—·33
February 13, 1912	*4,930	·54	4,835	·23	5,192	·41	4,600	·42	*4,370	·52
February 27, 1912	5,120	·27	4,955	·17	5,485	·42	4,945	·5	4,610	·35
March 12, 1912	5,491	·54	5,089	·19	*5.633	·37	5,311	·53	5,076	·68
Average	.....	·291	.....	·208	.....	·328	.....	·266	.....	·216

* One lamb died before this weighing.

GENERAL STATEMENT.

—	Lot 1.	Lot 2.	Lot 3.	Lot 4.	Lot 5.
Number of lambs in lot at beginning of period	50	50	50	50	50
Number of lambs in lot at end of period	49	50	49	49	49
Number of days in experiment	112	112	112	112	112
Total weight at beginning of experiment	3,969	3,923	3,907	3,928	3,967
Average weight per head at beginning of period	79·38	78·46	78 14	78·56	79 34
Total weight at beginning of experiment after deducting weight of loss above	3,890	.....	3,829	3,850	3,888
Total weight at end of experiment Lbs.	5,491	5,089	5,633	5,311	5,076
Gain per period "	1,601	1,166	1,804	1,461	1,188
Gain per head per period "	32·07	23 32	36·81	29·81	24·24
Gain per head per day "	·291	·208	·328	·266	216
Quantity of meal eaten by lot for period "	6,062	.....	6,062	2,200	2,200
Quantity of screenings eaten by lot for period "	.....	5,082	.....	.....	.....
Amount of alfalfa hay eaten by lot for period "	11,959	12,204	11,599	13,209	13,714
Quantity of roots eaten by lot for period "	.....	.....	9,985	9,985	.....
Total cost of feed $	120·42	73·72	131·10	100·52	90·57
Cost of the amount eaten by the 49 or 50 "	119·02	73·72	128·80	99·92	89 47
Cost of feed per head for period "	2 43	1·47	2·62	2·04	1·82
Cost of feed per head per day cts.	2·16	1·31	2·34	1·82	1·62
Cost to produce one pound gain "	7·43	6·32	7·13	6 84	7·53
Original cost of sheep @ 3.80c. per pound live weight $	147·82	149·07	145·50	146·30	147·74
Original cost of sheep plus cost of feed "	266·84	222·79	274·30	246 82	237·21
Sold at 6.25c. per pound live weight less 5% shrink "	326·63	302·16	334 46	315·34	301·39
Net profit on lot "	59·19	79·37	60·16	68·52	64·18
Net profit per lamb "	1·20	1·58	1·23	1·42	1·31

There were four lambs died during the feeding experiment, three of indigestion and one of some other cause. The groups these died from were not charged with the loss, instead we deducted it from the total profit of all the sheep.

DEDUCTIONS FROM THE EXPERIMENT.

Group 2 has shown the greatest profit. It will be noted that it received a ration composed of alfalfa, hay and screenings. This group had the others at a disadvantage in so far as it got the benefit of their better finish on the market being sold with them. Group No. 4 shows the second largest profit and these lambs were very fair in appearance. Group No. 5 stood third in the way of producing profit. The finish of the lambs in this group was relatively poor and it might be mentioned that they appeared to notice the severe weather more than did the other lots. The lambs in group 3 were a pleasure to look at and they certainly helped market the poorer lots. The profits from this bunch, as will be noted from the table, are very satisfactory, even if they have to take fourth place in this respect. Group No. 1 was fifth in rank but the lambs were of excellent quality.

The price obtained per ton for the alfalfa hay fed to the different groups, not considering labour, was:—

Group No. 1	$19 93	per ton.
Group No. 2	23 00	"
Group No. 3	20 37	"
Group No. 4	20 37	"
Group No. 5	19 36	"
Average	$20 61	"

SUMMARY.

First weight of the five lots, 250 lambs	lbs.	19,694
First weight of lambs that died (four)	"	314
First Weight of lambs after deducting loss	"	19,380
Average weight of lambs at beginning of experiment	"	78·77
Average rate of gain per sheep per day	"	·262
Final weight of the five lots	"	26,600
Average weight per lamb at finish	"	108·13
Total gain in period	"	7,220
Cost of feeding 246 lambs 112 days	$	511 03
Cost of one (1) pound gain for whole lot	lbs.	7·07
Total profit less labour, salt and interest on investment.	$	318 35
Loss of the feed eaten by the four (4) sheep that died.	"	5 30
Cost of sale	"	1 50
Labour for bunch	"	62 50
Interest on money invested	"	19 75
Total net profit on the five lots	"	229 30
Total net profit per head	"	0 93

FINANCIAL STATEMENT.

Cost of 250 lambs		$ 750 00
Cost of feed		516 43
Cost of salt		1 50
Cost of labour (estimated)		62 50
Interest on investment		19 75
Selling price	$1,579 38	
Net profit		229 30
	$1,579 38	$1,579 38

The total or gross profit from all the sheep was $311.55. In considering this from a business standpoint, $19.75 must be charged for interest, at 8 per cent. on the money tied up in these lambs for the four months, and also the cost of labour for looking after them during the same period. The actual cost of our labour in carrying out the experiment is much greater than it would have been if it had been carried out in a purely commercial manner. Mr. H. A. Suggitt, of Coaldale, and Mr. S. C. Cress, of Lethbridge, have fed sheep somewhat extensively and they both state that one man can feed and attend to 1,000 sheep without any difficulty. On this basis, allowing $50 per month for the man, it would cost $250 to feed one thousand sheep for five months, or $62.50 to feed two hundred and fifty head for the same period. This $62.50 for labour and the interest on investment, $19.75, reduces the net profit to $229.30 or a profit of 93 cents per lamb.

SALE.

Shortly before the end of the feeding period, letters were written to some of the leading buyers in the province, inviting them to bid for the carload, which resulted in our receiving a number of offers for the bunch. Mr. G. Jack, of the Swift Canadian Company, Edmonton, submitted the highest bid from any outside source and accordingly the sheep were sold to that company for 6¼ cents per pound live weight at the stock-yards at Lethbridge, less 5 per cent shrinkage. The following is a copy of a letter received from this company shortly after the sheep were sold:—

'Your letter of March 29 received this morning. I intended writing you a few days ago about the shrink on these lambs but was out in the country at the time.

The lambs killed out very well and figured 54½ per cent, which is extra good for lambs of that kind. In shipping these lambs, we should have clipped them, as I lost a few on the road coming up on account of having them too heavily loaded. These lambs shrunk 8 lbs. per head from the weights I paid you for, at Edmonton. The beef man there was very well pleased with the quality of these lambs and they suit our trade very well.

'For your information.

'Yours respectfully,

'(Signed) SWIFT CANADIAN CO., LTD.,

'Per G. JACK.'

ORCHARDS AND SMALL FRUITS.

Most of the apple trees wintered with but small amount of winter-killing. No. blooms were formed. The currants came through the winter in excellent condition but spring frosts injured the fruit buds so that no fruit was obtained.

RASPBERRIES.

The results from the raspberries were quite encouraging. As has been pointed out in previous reports, it is necessary to protect raspberry canes by bending them down and covering with earth before winter sets in. Manure is not a satisfactory substitute for the earth.

We have not many varieties set out but the following table gives the data in regard to the fruit obtained from ten varieties.

RASPBERRIES—(irrigated).

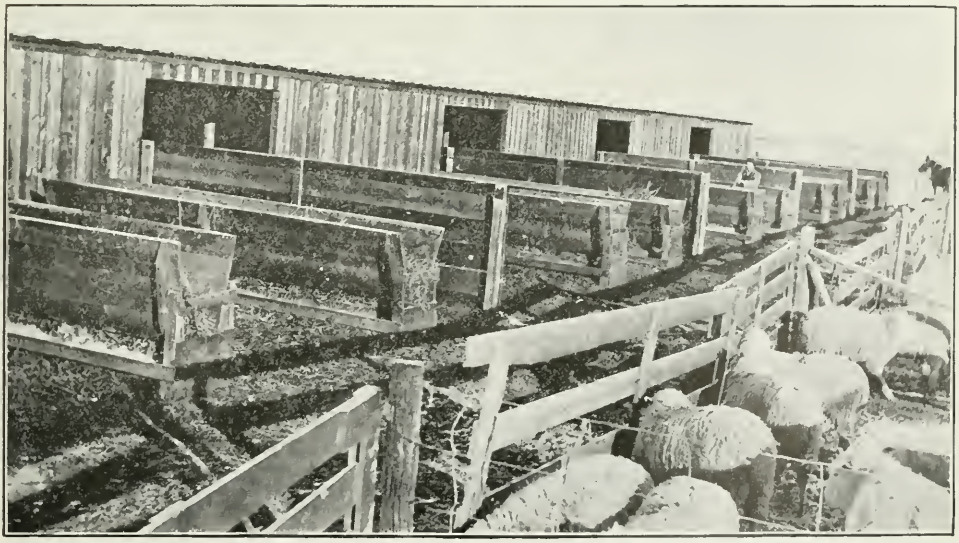
Variety.	Color.	Date of First Picking.	Date of Last Picking.	Number of Pickings.	Number of Bushes.	Actual Yield.	Estimated Yield per Acre.	Size of Berry.
						Pts.	Pts.	
1 Sunbeam	Red	July 17	Aug. 28	12	20	17¼	2,006	Medium.
2 Herbert	"	" 17	" 28	12	20	20	2,326	Large.
3 Louden	"	" 17	" 28	12	17	18¾	2,435	"
4 Marlborough	"	" 17	" 21	12	12	14	2,917	"
5 Early King	"	" 17	" 28	12	10	11¾	3,013	Medium.
6 Sarah	Dark Red.	Aug. 7	" 28	5	20	4	.....	"
7 Shaeffer'sColossal	Red.	July 22	" 15	6	2	2⅜	.....	"
8 Cowarth	Black	" 22	" 15	5	2	1½	.....	"
9 Golden Queen	Yellow.	" 26	" 15	3	4	¾	.....	Small.
10 Ruby	Red	" 17	" 3	3	2	¾	.....	Medium.

STRAWBERRIES—IRRIGATED.

The strawberries did very well. The bed was covered several inches deep with straw in the fall about the time the ground started to freeze up. For this purpose, straw a year old is better than fresh straw for the reason that it is less apt to blow off as it lies flatter. Another advantage is that many of the seeds in it have already germinated. Do not substitute manure for the straw as it sometimes smothers the plants.

We have thirty-two varieties under test. The bed was laid out with the rows three feet apart. Two rows each fifty feet long were set aside for each variety. The

Flock of Sheep at Experimental Station, Lethbridge, Alta.



Sheep yards and method of Feeding, Experimental Station, Lethbridge, Alta.

stand in many cases was poor, so that a report of the yields would not be of much value. The eight varieties that yielded the heaviest were the Beder Wood, Sample, Parsons' Beauty, Clyde, William Belt, August Luther, Senator Dunlap and Ridgeway. The Beder Wood yielded at the rate of 1,420 boxes per acre, the boxes being of the size commonly in use here containing four-fifths of an imperial quart. Among the eight varieties, the Senator Dunlap should receive special mention as being a particularly strong, vigorous grower.

TREES AND SHRUBS.

The trees in the border plantations and the ornamental shrubs wintered fairly well.

VEGETABLE GABDEN.

The results from the garden were not as satisfactory as in previous years. The last frost in the spring was somewhat later and the first one in the fall was earlier, than usual. This, in conjunction with the cooler weather during the summer on account of the greater number of cloudy days, was not favourable to the more tender vegetables such as tomatoes, squashes, corn, etc.

All the hardier vegetables, such as cabbage, cauliflower, beets, turnips, parsnips, etc., made very satisfactory growth. The celery, although planted late, came on well and was of exceptionally high quality.

FLOWERS.

The perennials, such as the pæonies, irises, etc., made a fine showing. An assortment of tulips put out during the previous October made a particularly brilliant display. Six varieties of narcissus were put out in the fall of 1910 along with the tulips. They bloomed nicely but are not so hardy as the tulips and do better if put in a more sheltered place. The usual assortment of annuals were planted and did reasonably well. The sweet peas and pansies, as usual, excelled in quality and abundance of bloom.

HORSES.

Eight work horses and four drivers are kept on the Station. In addition to this, there is a four-year old filly, an undesirable animal that will be disposed of.

CATTLE.

Two grade cows are kept to supply milk to the families on the Station.

MEETINGS AND CONVENTIONS ATTENDED.

The following meetings and conventions were attended and addresses given at most of them: The Western Canada Irrigation Association held at Calgary, August 8 to 10, the International Dry-Farming Congress at Colorado Springs, Colorado, in October, and the National Irrigation Congress at Chicago, December 5 to 9. As a member of the Grain Standards Board, I attended a meeting of that body in Winnipeg on October 25. I assisted at the Provincial Short Course Schools in Agriculture at Claresholm and Gleichen and spoke at a number of farmers' meetings at various times throughout the year. In February, I was in Ottawa at a conference of the Experimental Farms staff and had the opportunity of attending a number of

national conventions which were held in that city during the early part of February. In March, I addressed a meeting of the Southern Alberta Wool Growers' Association at Lethbridge.

DISTRIBUTION OF SAMPLES.

As the free distribution of samples of spring grain is now made from the Central Farm at Ottawa exclusively, potatoes and winter wheat are all that are distributed from here. The following material has been sent out or promised up to March 31, 1912.

	No.
Three-pound bags of potatoes	430
Five-pound bags of winter wheat	20

A small number of willow and poplar cuttings together with a four-ounce bag of Manitoba maple seeds have been promised to a number of applicants, amounting in all to 145.

INOCULATED ALFALFA SOIL.

A charge is now made of $1 to all applicants who desire inoculated alfalfa soil. On the payment of this amount by any farmer in Southern Alberta, the Station will supply a bag of inoculated alfalfa soil containing not less than one hundred pounds and will prepay the freight on the same to the applicant's nearest railway station. For the year ending March 31, 1912, 116 sacks have been shipped out or promised.

CORRESPONDENCE.

During the twelve months ending March 31, 1912, there were 3,670 letters received and 3,756 sent out, not including circulars and reports.

ACKNOWLEDGMENTS.

In July, Mr. F. L. S. Grisdale, a graduate of Macdonald College, came to the Station in the capacity of Assistant Superintendent and it is a pleasure to acknowledge his careful and able assistance. I wish also to take this opportunity of expressing my appreciation of the faithful and loyal services of Mr. G. D. McMillan, the foreman, and Mr. E. E. Eisenhauer, my secretary, and also those of Mr. Chas. Giffin, who has been in the employ of the Station for the past three years.

METEOROLOGICAL REPORT.

Months.	Highest Temperature F.		Lowest Temperature. F.		Total Precipitation.	Bright Sunshine
1911.	Date.	Degrees.	Date.	Degrees.	Inches.	Hours.
April	21	75·3	4	0·4	0·82	219·8
May	5	87·6	1	25·2	1·9	199·2
June	19	86·5	6	35·4	4·71	296·9
July	25	92·5	5	37 9	2·27	329·6
August	19	85·9	27	29·4	3·63	251·4
September	2	82·9	25	25·4	4·16	213·2
October	9	79·4	25	9·7	0·57	187·1
November	3	50·4	10	−23·5	0·95	95·6
December	3	58·1	29	−34·3	0·77	79·7
1912						
January	15	48·6	11	−30·5	0·69	111·7
February	11	49·2	29	−23·5	0·4	140·6
March	27	63·3	4	−22·5	0·44	230·9
Totals					21·31	2,365·7

In the above table, ten inches of snow is computed as one inch of precipitation.

I have the honour to be, sir,
Your obedient servant,

W. H. FAIRFIELD,
Superintendent.

EXPERIMENTAL STATION FOR CENTRAL ALBERTA

REPORT OF G. H. HUTTON, B.S.A., SUPERINTENDENT.

LACOMBE, ALTA., March 31, 1912.

J. H. GRISDALE, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa, Ont.

SIR,—I have the honour to submit the fifth annual report of the work of the Experimental Station for Central Alberta at Lacombe, Alta., for the year ending March 31, 1912.

The growing season of 1911 was peculiar to itself, the rain fall being heavier and mean temperature lower for every month without exception than the season of 1910. Spring opened rather later than the average of the five past seasons. The first seeding in each of these years was made on the dates as follows: 1907, April 30; 1908, April 10; 1909, April 19; 1910, March 31; and 1911, on April 22. The weather conditions after seeding were such as to retard germination, and high winds after the grain was above ground two or three inches checked growth. As compared with the season of 1910 the precipitation for 1911 was remarkable. For the six months from April 1, 10·6 inches of rain fell in 1910, while for the same period in 1911 the precipitation amounted to 17·8 inches.

Winter wheat wintered well particularly on breaking and has given profitable yields. The heavy rain caused a very rank straw growth and cool weather delayed maturity to such an extent that the spring wheat was caught by frost before it was ripe. With one exception all the fields of wheat in the rotations have paid the cost of production when valued at one cent per pound for feeding purposes and in one instance the wheat field paid a profit of $7.33 per acre.

The root crop was practically a failure, the yield of potatoes fair, and of corn poor. Small fruits have produced a fair crop while the apple orchard has made a good growth.

The ground froze up on October 21 which was ten days earlier than the earliest previous record and very little fall ploughing was done.

Snow falling on November 6 before threshing was completed delayed this operation greatly. Beyond the delay and extra cost of getting work done, no loss was suffered at the Station from this cause.

The winter with the exception of the first two weeks in January has been moderate and enjoyable weather. Snow was deep at no time though sleighing was good from November 18 to the last week in February.

EXPERIMENTS WITH WINTER WHEAT.

Nine varieties of winter wheat sown in 1910 on breaking of that season gave the following yields in 1911. Winter wheat has come through the winter in better condition when sown on breaking year after year than when sown on summer fallow.

WINTER WHEAT—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw including head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
					Ins.		Ins.	Lbs.	Bush.	Lbs.	Lbs.
1	Kharkov	Aug. 18	Sept. 6	384	46½	10	3	3,180	53	..	61
2	Early Windsor	" 18	" 6	384	47	10	3	3,060	51	..	60¾
3	Abundance	" 18	" 6	384	50	10	3	2,907	48	27	61½
4	Dawson's Golden Chaff	" 18	" 12	390	52	10	3¼	2,535	42	15	60¼
5	Prosperity	" 18	" 6	384	50	10	3¼	2,528	42	8	59¾
6	Reliable	" 18	" 6	384	50	10	3	2,302	38	22	61¼
7	Alberta Red	" 18	" 6	384	44	10	2½	2,129	35	28	61½
8	Red Chief	" 18	" 6	384	46	10	3	1,819	30	19	61
9	Red Velvet Chaff	" 18	" 12	390	50	10	3	1,746	28	58	61

WINTER WHEAT—Quantities of Seed per Acre.

Kharkov winter wheat was sown on August 18 at the following rates of seed per acre:—

Variety.	Quantity of Seed.	Date Sown 1910.	Date Cut 1911.	Yield Per Acre.	
				Bush.	Lbs.
Kharkov	¼ bushel.	Aug. 18	Sept. 10	53	45
"	⅝ "	" 18	" 9	48	
"	1 "	" 18	" 8	47	45
"	1¼ "	" 18	" 6	45	45
"	1⅝ "	" 18	" 6	46	45
"	1¾ "	" 18	" 6	43	45
"	2 "	" 18	" 6	53	15

WINTER WHEAT—Dates of Sowing.

Tests in dates of sowing of winter wheat conducted in the season of 1911 have given the same general result as those of previous years. Basing advice on these results, winter wheat should be sown in Central Alberta about the middle of August.

EXPERIMENTS WITH SPRING WHEAT.

The experiments with spring wheat were not productive of results of any value in 1911 for the reason that the land on which the test of varieties was being conducted was badly washed out on June 21 and thus the standing of the varieties does not indicate their merit. Other experiments in spring wheat did not come to full maturity and were not threshed.

EXPERIMENTS WITH RYE.

One plot of fall rye was sown on August 18, 1910, on breaking of that year and one of spring rye on April 29, 1911, on land that had been in potatoes in 1910.

Variety.	Date Ripened.	No. Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield Per Acre.	
			Ins.		Ins.	Lbs.	Bush.	Lbs.
Fall Rye	Aug. 24	371	66½	9½	3¾	7,475	28	10
Spring Rye	Sept. 13	138	53	10	4¼	5,560	26	24

EXPERIMENTS WITH EMMER AND SPELT.

Emmer and spelt have been tried at this Station for five years and as a result of these tests it is impossible to recommend either of these grains for this part of Alberta.

EXPERIMENTS WITH OATS.

Twenty-one varieties of oats were sown in 1911 on land that had been in roots and potatoes in 1910. Plots were one-fortieth of an acre; the soil was a black clay loam and the seeding was done on April 29. Seed was used at the rate of from two bushels and three pecks to three bushels per acre.

OATS—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after cleaning.
					In		In.	Lbs.	Bush.	Lbs.	Lbs.
1	Pioneer	Apr. 29.	Sept. 13.	137	54	10	8¾	4,637	136	13	43
2	Irish Victor	" 29.	" 11.	135	59	9	9	4,310	126	26	42
3	Siberian	" 29.	" 14	138	57	10	7½	4,160	122	12	40¾
4	Guelregn	" 29.	" 9.	133	61	10	8	4,050	119	4	43½
5	Swedish Select	" 29.	" 14.	138	55	10	8½	4,028	118	16	40¾
6	Tartar King	" 29.	" 11.	135	62	9	9½	4,014	118	2	38½
7	Abundance	" 29.	" 14.	138	56	10	8¼	3,904	114	28	44
8	Improved American	" 29.	" 13.	137	59	7	8	3,900	114	24	41
9	Golden Beauty	" 29.	" 14.	138	55	5	7½	3,870	113	28	35¼
10	Gold Rain	" 29.	" 9.	133	58	7½	8¼	3,703	108	31	44½
11	Danish Island	" 29.	" 13.	137	59	5	8	3,650	107	12	38
12	Segerhafre	" 29.	" 15.	139	56	7	7	3,620	106	16	41
13	Victory	" 29.	" 19.	143	57	9½	7	3,600	105	30	42½
14	Banner	" 29.	" 19.	143	62	5	8	3,470	102	2	35½
15	Thousand Dollar	" 29.	" 13.	137	56	8½	7½	3,230	95	00	36
16	Blackhafre	" 29.	" 15.	139	68	8	8½	3,201	94	5	35½
17	Twentieth Century	" 29.	" 19.	143	60	10	7½	2,880	87	2	36
18	Improved Ligowo	" 29.	" 9.	133	56	8	6½	2,955	86	31	41
19	Regenerated Abundance	" 29.	" 13.	137	56	9½	7½	2,950	86	26	38½
20	Ligowohafre	" 29.	" 9.	133	54	8	7	2,880	84	24	37
21	Stormogulhafre	" 29.	" 15.	139	55	6	10	2,730	80	10	31

Oats—Dates of Sowing.

A test was again made this year to determine the desirability of early seeding of oats.

Variety.	Date Sown.	Date Ripened.	No. of Days Maturing.	Weight of Straw.	Yield Per Acre.	
				Lbs.	Bush.	Lbs.
Banner	May 6th.	Sept. 19.	136	11240	67	2
"	" 13th.	" 19.	129	11960	38	28
"	" 20th.	" 19.	122	11680	42	12
"	" 27th.	" 19	115	11520	35	10

Oats—Quantities of Seed.

Tests have been made for a sufficient length of time with varying quantities of seed per acre to warrant the statement that for Central Alberta from three to three and one-half bushels of seed per acre are likely to give the best results on well-worked soils similar to that at this station. Along the eastern boundary of the province where there is not such a large percentage of humus in the soil nor such a great depth of surface soil, less seed than the amounts named may be found to give best results.

EXPERIMENTS WITH BARLEY.

The test of varieties of barley was conducted on black clay loam soil that was in roots and potatoes in 1910. The plots were one-fortieth of an acre in size and both six-rowed and two-rowed varieties were sown on April 28. Seed was used at the rate of two bushels and one peck per acre.

Six-row Barley—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
					In.		In.	Lbs	Bush.	Lbs.	Lbs.
1	Hannchen	Apr. 28	Sept. 5	130	50	7	3	3940	78	36	48½
2	Hannchenkorn	" 28	Aug. 31	125	48¼	8	2¾	3268	68	4	52
3	Prinsesskorn	" 28	Sept. 2	127	42¼	8	3	3210	66	42	46
4	Primuskorn	" 28	" 1	126	53	8	2⅔	3190	66	22	50½
5	Swedish Chevalier	" 28	" 5	130	48½	7	4	2920	60	40	45½
6	Svanhalskorn	" 28	Aug. 25	119	39½	10	2½	2880	60	..	50½
7	Invincible	" 28	Sept. 5	130	56½	7½	3½	2870	59	38	43
8	Danish Chevalier	" 28	" 1	126	57½	9½	4½	2770	57	34	47
9	Early Chevalier	" 28	" 1	126	53	9½	2¾	2770	57	34	49
10	Standwell	" 28	" 5	130	51½	7	2½	2690	56	2	42½
11	Clifford	" 28	Aug. 31	125	57	10	3¼	2660	55	20	49
12	Canadian Thorpe	" 28	Sept. 1	126	55½	9	3¼	2620	54	28	43
13	Beaver	" 28	Aug. 31	125	60	10	4¼	2360	49	8	47

TWO-ROW BARLEY—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw, including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.		Weight per measured bushel after Cleaning.
					In.		In.	Lbs	Bush.	Lbs.	Lbs.
1	Claude	Apr. 28	Sept. 1	126	51½	9½	3	4430	92	14	43
2	Manchurian	" 28	" 5	130	56½	9	3¼	4240	88	16	45½
3	Albert	" 28	" 1	126	55	10	3¾	4210	87	34	45
4	Mansfield	" 28	" 1	126	53	8½	2¾	4000	83	16	48½
5	O.A.C. No. 21	" 28	" 5	130	56¾	8½	2¾	3880	80	40	45
6	Nugent	" 28	" 5	130	57	9	3¼	3880	80	40	47
7	Odessa	" 28	Aug. 29	123	52	7	2¾	3720	77	24	46
8	Oderbruch	" 28	Sept. 2	127	55½	9	3¼	3720	77	24	47
9	Stella	" 28	" 1	126	56	10	3	3670	76	22	48
10	Trooper	" 28	" 1	126	53¼	10	3½	3550	73	46	46
11	Guy Mayle	" 29	Aug. 24	117	34	10	2¼	2700	56	12	61½

PEAS AND OATS AS A MIXTURE FOR GREEN FEED OR FOR CURING FOR HAY.

Reference was made in the report for the year ending March 31, 1911, to the possibilities of the above mixture as a feed for dairy cattle or other farm stock. Eight acres were seeded this year to a mixture of two bushels of oats and one of peas per acre. The product of this area cut and cured as hay was put over the scales when ready for stacking and produced fodder at the rate of four tons and forty-two pounds per acre. The value per acre of this crop is shown in tables covering rotation 'K' and rotation 'O.'

EXPERIMENTS WITH ALFALFA.

Of the varieties of alfalfa under test, Grimm and Turkestan are holding the lead. *Medicago falcata,* the Siberian strain, is proving perfectly hardy. The general conclusion is evident that where hardy strains are secured and inoculation of the soil successfully carried out the growing of alfalfa may be attempted here with every prospect of satisfactory results. An area of about twelve acres is now seeded to alfalfa and gave an average yield this year of two tons sixteen hundred and sixty-five pounds per acre. The following letter gives the opinion of Mr. C. A. Julian Sharman, of Red Deer, of alfalfa as a feed:—

RED DEER, ALTA., March 9, 1912.

G. H. HUTTON, B.S.A.,
Superintendent, Experimental Station,
Lacombe, Alta.

DEAR SIR,—The crop of alfalfa grown on soil inoculated with earth received from you has certainly been of a rank, rich colour. Gave a very fair crop in 1910 and an excellent crop in 1911; the amount I would not like to estimate, as I believe one is prone to exaggerate yields on small areas. You may be interested to know that the roughage Rosalind of Old Basing has received the last six months (September 1, 1911, to March 1, 1912) has practically consisted of the crop from our alfalfa patch and that during that time she has given 7,897 lbs. of milk, 521 lbs. of butter, which with the value of skim milk has produced f.o.b. Red Deer $225. Two weeks

ago we ran out of alfalfa and her yield per day dropped from 43 lbs. to 39 lbs. I have now got (two days ago) a supply of alfalfa from Lethbridge and she has already gone back to 43 lbs. I have been shipping in alfalfa meal from Los Angeles, California, this winter in small quantities, but for next winter I have quite made up my mind to buy alfalfa hay by the carload: it will cost me about $25 per ton but I know there will be more money in it than prairie hay at $8 to $10.

This year I would like to seed a further seven or eight acres to alfalfa. I hate to disturb the plot we have to get the necessary soil even if it is sufficiently inoculated, which I do not know. Can you sell me seven or eight hundred pounds of soil and if so what would it be worth at Red Deer?

Yours very truly,

(Signed) C. A. JULIAN SHARMAN.

EXPERIMENTS WITH INDIAN CORN.

On account of the cold, wet season the yields of Indian corn are low. Seven varieties were planted on May 27, on land which had been in summer-fallow in 1910. The seed was planted in hills two and one-half feet apart each way. The crop was cut on August 28.

INDIAN CORN FOR ENSILAGE—Test of Varieties.

No.	Name of Variety.	Date of Sowing.	Date of Cutting.	Weight per acre grown in hills.	
				Tons.	Lbs.
1	Longfellow	May 27	Aug. 28	5	1,484
2	North Western Dent	" 27	" 28	4	976
3	Angel of Midnight	" 27	" 28	4	118
4	Eureka	" 27	" 28	3	1,936½
5	Compton's Early	" 27	" 28	3	798
6	Selected Leaming	" 27	" 28	2	1,478
7	Superior Fodder	" 27	" 28	2	356

EXPERIMENTS WITH FIELD ROOTS.

Turnips, carrots, mangels and sugar beets were all seeded on May 13 on land that had been in wheat in 1910. They were sown on the flat in drills thirty inches apart. On June 21 a very heavy rain of one and one-fifth inches in twenty minutes caused a washout over the root field so that the reports of the variety tests of this entire line of experiments are valueless.

POTATOES.

Twenty-two varieties of potatoes were planted in 1911 on land that had been in wheat in 1910, fall ploughed and packed. The potatoes were planted on May 24 in rows two and one-half feet apart. The seed was cut to about two eyes to the piece and the cuttings were dropped about fourteen inches apart in the row and covered to a depth of about three to four inches. Frequent shallow cultivation was given throughout the season and high hilling was not practised. They were dug Sept. 30.

POTATOES—Test of Varieties.

Name of Variety.	Average size.	Total yield per Acre.		Total yield marketable.		Total yield unmarketable.		Form and Colour.
		Bus.	Lbs.	Bus.	Lbs.	Bus.	Lbs.	
British Queen	Medium	269	30	194	04	75	26	White, oval.
Table Talk	"	267	51	235	13	32	38	"
Reeves' Rose	Small	245	51	154	53	90	58	Red, oval.
Empire State	"	221	6	128	4	93	2	White, oval.
Ashleaf Kidney	"	217	48	148	7	69	41	Pink, oval.
Everett	"	214	30	160	52	53	28	Red, oval.
American Wonder	Medium	211	12	173	11	38	1	White, oval.
Late Puritan	Large	208	27	191	46	16	41	"
Carman No. 1	Medium	204	36	153	31	51	5	"
Morgan Seedling	"	200	12	150	9	50	3	Pink, long.
Rochester Rose	Small	182	3	118	19	63	44	"
Irish Cobbler	Medium	155	6	116	19	38	47	White, round.
Gold Coin	Small	147	57	99	7	48	50	White, oval.
Dreer's Standard	Medium	132	00	92	24	39	36	"
Vick's Extra Early	"	123	12	96	5	27	7	"
Dalmeny Beauty	Small	92	57	49	15	43	42	White, long.
Dooley	Large	83	3	67	16	15	47	White, oval.
Holborn Abundance	"	77	00	60	43	15	77	"
Pioneer	"	67	39	54	7	13	32	"
Hard to Beat	Small	45	39	23	16	22	23	Flat, white
Factor	"	42	54	23	36	19	18	Round, white.
Money Maker	Medium	41	15	30	56	10	19	White, long.

EXPERIMENTS WITH FIELD PEAS.

The early varieties of field peas have again demonstrated their superiority for Central Alberta. Among the varieties recommended are: English Grey, Early Harvest and Mackay.

ROTATIONS.

The following rotations are now under way. The tables indicate the run of the rotations, show the yield secured and the profits per acre of each:—

ROTATION RECORD 'C'—(Crop year, 1911).

| Items of Expense in Raising Crop. | | |

Rotation Record 'K'—(Crop year, 1911).

Items of Expense in Raising Crop.													Particulars of Crop.										
Rent and Manure.	Seed, Twine and Use of Machinery.	Manual Labour.		Horse Labour (including teamster).					Cost of Threshing.	Total Cost.	Cost for 1 Acre.	Cost for 1 Bushel.	Height of Stubble.	Weight in Pounds.				Total Value.	Value of Crop per Acre.	Profit per Acre.	Rotation.	Lot.	Area in Acres.	This Year.
		Hours Manual Labour.	Cost of Manual Labour.	Hours.				Value of Horse Labour.						Grain.	Straw.	Hay.	Roots and Ensilage.						
				Single Horse.	2 Horse Team.	3 Horse Team.	4 Horse Team.																
$ cts.	$ cts.	$ cts.	$ cts.	Hr.m.	Hr. m	Hr. m	Hr. m	$ cts.	$ cts.	$ cts.	$ cts.	Cts.	Ins	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.				
15 64	9 41	15½	2 94	.....	15¾	7 50	9 32	12 87	5 03	45 89	11 74	63·08	6	4,314	16,068	.....	.....	51 17	13 09	1 35	K	1	3,909	Spring Wheat.
15 64	6 88	7¼	1 38	.....	8 25	2 45	9 13	8 64	5 45	37 99	9 72	34·08	6	5,235	7,077	.....	.....	59 43	15 20	5 48	K	2	3,909	Barley.
15 64	7 31	12·40	2 41	.....	7 35	3 30	9 13	8 65	5 99	40 00	10 23	26·07	6	5,092	11,350	.....	.....	62 27	15 93	5 70	K	3	3,909	Oats.
15 64	7 76	20·10	3 83	.....	7 25	2 45	9 13	8 30	6 84	42 37	10 84	24·08	6	5,812	18,840	.....	.....	76 96	19 69	8 85	K	4	3,909	Oats.
15 64	14 41	51·55	9 86	.....	33 05	3 35	9 13	17 70	.....	57 61	14 74	.....	6	.....	.....	33,890	.....	169 45	43 35	28 61	K	5	3,909	Green Feed.
15 64	25 95	372·05	70 70	44 50	108 25	.....	9 13	53 38	.....	165 67	42 38	.....	....	.....	.....	.....	23,609	185 45	47 44	5 06	K	6	3,909	Hoed Crop.
93 84	70 92	479·35	91 12	44 50	180 40	20 25	55 37	109 54	23 31	389 53	.....	$1·501		20,453	53,335	33,890	23,609	604 73	.....	55 05	.....	..	23,454	
4 01	3 02	20·27	3 88	1 55	7 43	52	2 22	4 67	.99	.....	16 61	Cts. 25		872	2,274	1,445	1,007	.....	25 78	9 18	.....	..	.....	

ROTATION RECORD 'L'—(Crop year, 1911).

ITEMS OF EXPENSE IN RAISING CROP.														PARTICULARS OF CROP.									
		Manual Labour.		Hours of Labour (including teamsters).										Weight in Pounds.									
				Hours.																			
Rent and Manure.	Seed, Twine and Use of Machinery.	Hours Manual Labour.	Cost of Manual Labour.	Single Horse.	2 Horse Team.	3 Horse Team.	4 Horse Team.	Value of Horse Labour.	Cost of Threshing.	Total Cost.	Cost for 1 Acre.	Cost for 1 Bushel.	Height of Stubble.	Grain.	Straw.	Hay.	Total Value.	Value of Crop per Acre.	Profit per Acre.	Rotation.	Lot.	Area in Acres.	This Year.
$ cts.	$ cts.	Hr. m.	$ cts.		Hr. m.	Hr. m.	Hr. m.	$ cts.	$ cts.	$ cts.	$ cts.	Cts.	Ins.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.				
6 96	2 31	13 30	2 56	2½	6½	....	.....	2 88	.....	14 71	8 45	.....	....	....	.....	6,477	32 38	18 60	10 15	L	1	1·74	Hay.
6 96	2 31	13 30	2 56	2½	6½	.....	.....	2 88	.....	14 71	8 45	.....	....	....	.....	6,477	32 38	18 60	10 15	L	2	1·74	Hay.
6 96	2 31	2 30	0 47	½	3⅜	.....	.....	1 40	....	11 14	6 40	.....	....	.....	.....	3,096	20 48	11 77	5 37	L	3	1·74	Pasture.
6 96	4 25	4 55	0 93	....	8¾	4¾	4½	6 99	1 05	20 18	11 50	1 34	6	900	8,980	500	15 99	9 19	—2 31	L	4	1·74	Wheat.
6 96	3 28	7 40	1 46	....	4 50	1 35	5 03	4 71	3 27	19 68	11 31	24 09	6	2,778	5,170	....	32 95	18 94	7 63	L	5	1·74	Oats.
6 96	3 33	2 55	0 55	....	3 20	2 00	5 03	4 37	2 23	17 44	10 02	39 1	6	2,138	4,060	.... ..	25 44	14 62	4 60	L	6	1·74	Barley.
41 76	17 79	45 00	8 53	5 30	33 25	8 20	14 36	23 23	6 55	97 86	...	.....	....	5,816	18,210	16,550	159 62	.....	35 59	....	....	10·44	... ...
4 00	1 70	1 19	0 82	0 32	3 12	0 47	1 24	2 23	0 63	.....	9 36	32 87	...	557	1,744	1,585	....	15 29	3 40	....	....	....	... .

ROTATION RECORD 'N'—(Crop year, 1911).

ITEMS OF EXPENSE IN RAISING CROP.												PARTICULARS OF CROP.								
Rent and Manure.	Seed, Twine and Use of Machinery.	Manual Labour.		Horse Labour (including teamsters).					Total Cost.	Cost for 1 Acre.	Height of Stubble.	Weight in Pounds.	Total Value.	Value of Crop per Acre.	Profit per Acre.	Rotation.	Lot.	Area in Acres.	Last Year.	This Year.
		Hours Manual Labour.	Cost of Manual Labour.	Hours.				Value of Horse Labour.				Hay.								
				Single Horse.	2 Horse Team.	3 Horse Team.	4 Horse Team.													
$ cts.	$ cts.	Hr.m.	$ cts.	Hr.m.	Hr.m.	Hr.m.	Hr.m.	$ cts.	$ cts.	$ cts.	Ins.	Lbs.	$ cts.	$ cts.	$ cts.					
4 03	4 87	10 29	1 99	0 38	4 18	.. ..	.....	1 63	12 52	11 56	...	4,195	25 17	23 27	11 71	N	1	1·083	Alfalfa..	(Alfalfa.
4 03	4 87	10 29	1 99	0 38	4 18	.. ..	....	1 63	12 52	11 56	.....	4,195	25 17	23 27	11 71	N	2	1·083	" ...	"
4 03	4 87	10 29	1 99	0 38	4 18	....	.....	1 63	12 52	11 56	.....	4,195	25 17	23 27	11 71	N	3	1 083	" ...	"
4 03	4 87	10 29	1 99	0 38	4 18	.....	.....	1 63	12 52	11 56	.....	4,195	25 17	23 27	11 71	N	4	1·083	" ...	"
4 03	4 87	10 29	1 99	0 38	4 18	.....	.....	1 63	12 52	11 56	.....	4,195	25 17	23 27	11 71	N	5	1·083	" ...	"
4 03	4 87	10 29	1 99	0 38	4 18	....	.....	1 63	12 52	11 56	.... .	4,195	25 17	23 27	11 71	N	6	1·083	" ...	"
4 03	2 73	4 25	0 84	. .	9 35	0 55	2 50	5 00	12 60	11 61	6	9,628	48 14	44 37	32 76	N	7	1·083	" ...	Green feed
28 21	31 95	97 19	12 79	3 48	35 23	0 55	2 50	14 78	87 72	.....	.....	34,798	199 68	.....	103 02	....	....	7·581	.....	.....
3 72	4 21	8 53	1 68	0 30	4 40	0 07	0 22	1 95	.....	11 57	....	4,590	.....	26 25	13 59	....	....	....	....	.....

ROTATION RECORD 'O'—(Crop year, 1911).

ITEMS OF EXPENSE IN RAISING CROP.														PARTICULARS OF CROP.										
		Manual Labour.		Horse Labour (including teamster.)										Weight in Pounds.										
				Hours.																				
Rent and Manure.	Seed, Twine and Use of Machinery.	Hours Manual Labour.	Cost of Manual Labour.	Single Horse	Two Horse Team.	Three Horse Team.	Four Horse Team.	Value of Horse Labour.	Cost of Threshing.	Total Cost.	Cost for 1 Acre.	Cost for 1 Bushel.	Height of Stubble.	Grain.	Straw.	Hay.	Roots and Ensilage	Total Value.	Value of Crop per Acre.	Profit per Acre.	Rotation.	Lot.	Area in Acres.	This Year.
$ cts.	$ cts.	Hr.m.	$ cts.	Hr.m.	Hr.m.	Hr.m.	Hr.m.	$ cts.	$ cts.	$ cts.	$ cts.	Cts.	In.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.				
9 18	8 00	9 05	1 73	.....	9 35	3 30	2 55	6 09	5 10	30 10	9 38	41·3	6	4,372	19,860	.....	.....	53 65	16 71	7 33	O	1	3·2107	Wheat.
7 79	5 77	17 55	3 40	.....	19 40	5 55	5 00	11 52	4 65	33 13	12 15	14·0	6	3,950	10,050	13,144	.....	115 27	42 27	30 12	O	2	2·727	Oats.
9 33	1 96	8 55	1 69	.....	10 17	.....	12 56	9 71	.....	22 69	6 96	....		.....	.....	.....	.....	... .	.....	.....	O	3	3·262	Summer-fallow.
11 78	8 04	11 55	2 26	.....	6 42	5 20	7 36	8 12	8 28	38 48	9 34	23·2	6	7,955	12,620	.. ..	.. ...	92 17	22 40	13 06	O	4	4·119	Barley.
11 78	8 34	22 50	4 34	. . ..	7 08	3 40	8 36	8 06	11 25	43 77	10 63	15·5	6	9,560	12,260	.....	.....	107 86	26 19	15 56	O	5	4·119	Oats.
11 78	15 09	62 25	11 86	....	25 38	8 45	8 36	16 44	.....	55 17	13 39	....	6	.....	.... .	30,540	.....	152 70	37 07	23 68	O	6	4·119	Green feed.
11 78	23 82	198 40	37 75	47 15	53 11	.....	6 48	34 10	.....	107 45	26 09	....		.....	.....	.....	32,118	254 58	61 80	35 71	O	7	4·119	Hoed crop.
73 42	71 02	331 45	63 03	47 15	132 11	27 10	52 27	94 04	29 28	330 79	.....	94·0		25,837	54,790	43,684	32,118	776 23	.....	125 46	..	..	25·6757	
2 86	3 06	12 55	2 46	1 15	5 08	1 03	2 03	3 66	1 14	.....	12 88	13·4		1,006	2,134	1,701	1,251	.....	30 23	17 92	..	..	.....	

SUMMARY OF CROPS—1911.

	Bush.	Lbs.
Wheat—		
9·9427 acres	159	46
12 uniform test plots	3	..
Oats—		
16·404 acres	790	32
21 uniform test plots	31	11
Winter Wheat—		
7·699 acres	252	..
13 uniform test plots	5	13
Barley—		
11·768 acres	417	22
24 uniform test plots	42	21
Peas—		
13 uniform test plots	2	36
Potatoes—		
3·44 acres	800	..
Roots—		
2 acres	174	..
Hay—	Tons.	Lbs.
Timothy, 8·23 acres	16	676
Alfalfa, 13·98 acres	24	17
Mixed hay, 4·25 acres.		

GARDEN VEGETABLES.

BEANS.

Beans were planted on May 31 in rows thirty inches apart. Plants were up on June 10 and commenced to bloom on July 21. The variety Challenge Black Wax selected by the Central Experimental Farm was the only one which became fit for table use.

BEETS.

Beets were sown on May 9, germinating poorly making it necessary to sow again on June 3. The later sown made a very rapid growth. Seven varieties were tested.

Variety.	In Use.	Yield per Acre.	
		Bush.	Lbs.
Egyptian	Aug. 28..	580	48
Eclipse	" 28..	539	36
Early Blood Red Turnip	Sept. 1..	464	38
Meteor	Aug. 31..	421	4½
Ruby Dulcet	" 31.	392	2½
Black Red Ball	Sept. 8..	212	57
Egyptian Dark Red Flat	" 10..	111	31

BRUSSELS SPROUTS.

Seed was sown April 17 in the frame and transplanted on June 7. The plants were not attacked by the root maggot to the same extent as cabbage and cauliflower. The variety grown was Dwarf Improved and was ready for use on September 20.

CABBAGE.

The first sowing was made March 31 in the hot-bed. Transplanting into the open commenced on May 12. The following varieties were tested:—

Variety.	In Use.	Average Weight.
Flat Swedish	Sept. 10..	10½ lbs.
Improved Amager Danish Roundhead	" 11..	10 "
Extra Amager Danish Ballhead	" 25..	9 "
Early Jersey Wakefield	Aug. 21 .	9 "
Copenhagen Market	" 12..	8½ "
Large Late Flat Drumhead	Sept. 18..	6½ "
Magdeburg	" 25..	6½ "
Danish Summer Ballhead	" 7.	6½ "
Winningstadt	" 25..	6 "
Danish Ballhead	" 22..	5½ "
Lubeck	Oct. 22.	5½ "
Extra Dark Red Dutch	Sept. 23..	4½ "
Small Erfurt	" 9..	4 "
Danish Delicatesse Red	" 27..	4 "
Extra Early Midsummer Savoy	Aug. 28..	3½ "
Red Danish Stonehead	Sept. 29..	3 "

CAULIFLOWER.

Seed was sown in the frame April 20 and transplanted on June 6. The varieties are given below:—

Variety.	In Use.	Per cent. of Good Heads.
Danish Giant	Aug. 25..	33 per cent.
Early Snowball	" 11..	62 "
Extra Selected Early Erfurt Dwarf	" 11..	62 "

CARROTS.

Two sowings of carrots were made, the later one making the quicker growth and giving the heavier crop. Seed was sown on June 9 in rows thirty inches apart. The varieties were:—

Variety.	In Use.	Yield per Acre.	
		Bush.	Lbs.
French Horn	Sept. 5.	479	9
Oxheart or Guerande	Aug. 28.	464	38
Half Long Chantenay	" 28.	406	33
Chantenay	Sept. 5.	338	48
Nantes	Aug. 28.	256	31

CELERY.

Seed was sown in the frame April 10 and transplanted July 27 into trenches. The varieties were:—

Variety.	Average Weight of Twelve Heads.	Quality.
Paris Golden Market	8½ lbs.	Good.
Giant Pascal	9 "	Medium.
Rose Ribbed Paris	6 "	Fair.
French's Success	6 "	Very good.
Noll's Magnificent	8 "	Fair.
Evan's Triumph	8 "	Good.

SWEET CORN.

Seven varieties of corn were planted on May 19. Three varieties produced cobs, Squaw, Malakoff and Fordhook Early, the earliest being Squaw. The following varieties were tested:—

Malakoff,
Fordhook Early,
Golden Bantam,
Early Evergreen,
Devitt's Early Sugar,
Squaw,
Henderson's Metropolitan.

CUCUMBERS.

Four varieties were tried but no fruit set.

LETTUCE.

Two sowings of lettuce were made and both did well. Seed was sown on May 9 and June 9 in rows fifteen inches apart.

Sown in open May 9, germinated May 20, quantity sown 15 feet.

Sown in open June 9, germinated June 15, quantity sown 15 feet.

Variety.	Ready to Use.		No. Good Heads.		Quality.
	1st Sowing.	2nd Sowing.	1st Sowing.	2nd Sowing.	
Red Edged Victoria	July 14	Aug. 15	26	20	Good.
Wheeler's Tom Thumb	" 11	" 9	31	31	Good.
Cos Trianon	" 14	" 21	24	21	Poor.
All Heart	" 16	" 9	31	28	Very good.
*Grand Rapids	" 14	" 15	21	30	Medium.
Giant Crystal Head	" 14	" 15	31	26	
Black Seeded Simpson	" 4	" 15	31	24	Good.
†Crisp as Ice	" 12	" 9	30	28	Good.
Iceberg	" 7	" 15	29	24	
*Grand Rapids	" 14	" 15	19	28	Very good.
Hanson	" 14	" 15	23	24	Medium.
May King	" 13	" 9	20	28	Good.
Improved Hanson	" 7	" 14	31	29	Good.

* Different seedsmen. † Crisp as Ice is a red lettuce.

MUSK MELONS.

Six varieties of muskmelons and four of watermelons were planted on June 1, but none came to maturity.

ONIONS.

Seven varieties of onions were sown. The first sowing was made on May 1 but was destroyed by cutworms. A later sowing made June 3, proved too late for a crop.

PARSNIPS.

Seed of two varieties was sown in rows thirty inches apart May 1.

Variety.	Yield per Acre.	In Use.	Quality.
*Hollow Crown	416 14	Aug. 28	Good.
*Hollow Crown	484 ..	Aug. 28	Good.

* Different Seedsmen.

PARSLEY.

Double Curled Parsley was sown on May 1 and June 10. Both sowings made satisfactory growth.

PEAS.

Seed was sown in rows three feet apart and thirty feet long on May 18, of the following varieties:—

Variety.	In Use.	Crop.	Quality.
Gregory's Surprise	July 29	Light	Medium.
Gradus	Aug. 3	"	Good.
American Wonder	" 9	Medium	"
McLean's Advancer	" 14	Good	Fair.
Heroine	" 25	"	"
Stratagem	" 12	"	Good.
Telephone	" 15	"	"
Thomas Laxton	" 9	Medium	"
Premium Gem	" 1	"	"
Sutton's Excelsior	" 7	"	Medium.
Juno	" 29	Very good	Good.

Garden peas inoculated with 'Farmogerm' secured from the 'Earp-Thomas Farmogerm Co.,' Bloomfield, N.J., U.S.A., were planted in the garden May 31 in rows thirty feet long and untreated seed sown on the same date under similar conditions, gave the following results:—

—	Inoculated		Uninoculated	
	Vines	Pods	Vines	Pods
Garden peas	44 lbs.	12 lbs.	30 lbs.	9 lbs. 2 oz.

In addition to the marked difference in the weight of both vines and pods in favour of the inoculated row there was also a noticeable development in the bacterial growth on the roots of the peas grown from treated seed.

RADISHES.

Two sowings were made on May 1 and June 6 in rows thirty feet long. The following varieties were sown:—

Variety.	Second Sowing in use	Quality.
Forcing Turnip, scarlet	July 13	Poor.
Turnip Early, scarlet, white tipped	" 11	Good.
Non Plus Ultra	" 11	Medium.
Rosy Gem	" 11	"
White Icicle	" 13	Good.

SQUASH.

Eight varieties of squash were planted June 1 in hills nine feet apart each way. The only variety producing a crop was the Long White Bush Marrow.

TOMATOES.

A sowing made April 18 in the hotbed produced strong plants which were transplanted June 7. Ten varieties were tried. Only two set fruit, being Earliana C. E. F. 12/23 and Northern Adirondack Earliana.

TURNIPS.

One variety, Early White Flat Strapped, was sown May 1 and was ready for use July 11. The yield was 3,015 bush. 19 lbs. per acre. The table quality of these turnips in the early part of the season was good.

SALSIFY.

Long White Salsify was sown May 1 and was ready for use August 31. The roots were dug October 19. The yield per acre was 193 bush. 36 lbs.

FLOWER GARDEN.

The following varieties of annuals were sown in the frame March 31 and were out in the open June 23:—

Variety.	In Bloom.	
	From.	To.
Asters, (14 varieties)	Aug. 12	Severe frost
Abronia umbellata	No bloom	
Ageratum	"	
Antirrhinum (6 varieties)	"	
Balsam	"	
Brachycome	"	
Calendula	Aug. 5	Severe frost
Candytuft	July 8	
Celosia (3 varieties)	No bloom	
Coreopsis	July 27	Sept. 25
Dianthus (7 varieties)	Aug. 8	" 25
Eschscholtzia (2 varieties)	July 28	" 25
Gaillardia	Aug. 7	" 25
Helichrysum	July 27	" 25
Godetia	Aug. 15	" 25
Iberis	No Bloom	
Larkspur (3 varieties)	"	
Lobelia	Aug. 11	" 25
Nicotiana	Sept. 5	" 25
Nemophila	July 15	" 25
Pansy 8 varieties	July 4	" 25
Phlox Drummondi	Aug. 10	" 25
Scabiosa (3 varieties)	Aug. 18	Severe frost
Sultan Sweet	Aug. 30	
Stocks	July 8	"
Tagetes	No bloom	
Tropaeolum (4 varieties)	Aug. 9	
Verbena	Sept. 8	Severe frost
Zinnia	No Bloom	

The following varieties of annuals were sown in the open May 20:—

Variety.	In Bloom From.
Asters (10 varieties)	Sept. 18
Abronia umbellata	" 9
Antirrhinum	Aug. 5
Calendula	" 5
Candytuft	July 15
Clarkia (6 varieties)	Aug 21
Coreopsis	" 17
Dianthus	Sept. 8
Eschscholtzia	Aug. 1
Gaillardia	Sept. 7
Godetia	" 7
Helichrysum	Aug. 26
Iberis	July 15
Mignonette	" 27
Nicotiana	Sept. 18
Nemophila	Aug. 19
Poppy (4 varieties)	" 20
Portulaca	Sept. 4
Salpiglossis	" 7
Stocks	" 1
Tagetes	Aug. 26
Tropaeolum (3 varieties)	" 9
Verbena	" 28

SWEET PEAS.

Twenty-five varieties of sweet peas were sown May 12. Only six varieties bloomed and were too late in the season to make a display.

DAHLIAS.

A collection of dahlias were planted May 20. The following varieties bloomed:—

Maurice Rurone,
Matchless,
Flossie,
Jessie McIntosh,
Evadne,
Rosenhagen,
Countess of Lonsdale,
A. D. Levoni,
Bon Ton,
Cycle,
Capstan.

CANNAS.

A collection of cannas were planted May 22. None bloomed.

Variety.	Commenced to Bloom.
Darwin Mixture	June 2
Parrot	" 5
Picotee	" 8
Isabella	" 5
Duchesse de Parma	May 18
Joost van Vondel	" 15
Cottage Maid	" 15
Chrysolora	" 18
Couronne d'Or	" 19
Vermilion Brilliant	" 15
Keizerskroon	" 15
Artus	" 15
Pottebakker	" 15
Imperator Rubrorum	" 18
Golden Crown	June 2
Gesleriana Spathulata	" 5
Murillo	May 20

SMALL FRUITS.

Black, red and white currants, fruited for the first time and have not been tested long enough to state definitely the best varieties.

Gooseberries did not fruit.

Raspberries—Early King and Sunbeam produced the most fruit. Herbert produced fruit of a fine quality and size.

Strawberries—The order of merit according to yield was Beder Wood, Haverland, and Senator Dunlap.

ORCHARD.

Several varieties of apples bloomed, amongst them being Eve, Prince and Jewel. The fruit set was blown off and did not mature.

TREE PLANTING.

A Caragana hedge was planted west of the drive from barn to the north line and on the north side of the vegetable garden and through the small fruits. A number of ornamental trees and shrubs were planted on both sides of drive from main entrance to residence.

HORSES.

During the year one of the general purpose horses died from inflammation of the bowels. The other horses are in good condition, the number on hand at the close of the year being ten. A few of the horses were wintered outside at the straw stack and in thirteen weeks one heavy team made a gain of seventy pounds in weight. They were not fed, but were watered once daily and were without shelter.

CATTLE.

Four dairy cattle are kept, namely.—Two pure-bred Jersey heifers rising three years old, one grade Shorthorn cow and one pure-bred Jersey calf. These cattle are in good condition.

FEEDING FOR BEEF.

A carload of two and three year old steers averaging 1,003 lbs, were put in the corral on November 1. For the first month the feed consisted of peas and oats cured for hay. On December 1 a three-pound per head grain ration was fed, consisting of frozen wheat one-third and barley two-thirds, ground and fed on grain tables twice daily. On January 1, the forage ration was varied by including a mixture of alfalfa and brome hay with the peas and oat sheaves. During the whole feeding period the cattle ran to the straw stacks and consumed quite a large quantity of straw, in fact, I believe they could have been carried another month without hay with added profit. The grain ration was increased one pound per head per week until ten pounds per day was reached. After having been on this ration for five weeks the ration was again increased gradually until at the finish they were eating sixteen pounds per head per day. The chop for the whole feeding period was ground at the beginning and mixed so there could be no variation in the grain mixture. They were fed altogether outside, had access to water at all times, also salt. After hay-feeding was begun the cattle had all they could eat. The alfalfa hay is charged at $12 per ton while the brome hay which was cut from a pasture and hence was not of as high quality as it would have been if from a meadow, is valued at $7 per ton. In valuing the straw only an estimate is possible as the straw was not weighed.

The total labour, including hauling of feed, pumping of water and feeding, amounted to 434 hours of manual labour and 30 hours horse labour, and cost $83.54. The interest on the money invested in the cattle from September 1 to April 1 at 8 per cent amounted to $37.37. The manure produced valued at 75 cents per ton in the yard is estimated to be sufficient to balance the labour cost and interest charge. The cattle were on pasture two months prior to November 1 and the charge for this is $20. One steer, the value of which at first cost was $40.04, and in feed $8.63, totaling $48.67, was killed because he developed a bad case of lump-jaw. After covering this loss the average profit per head, after paying for all feed at prices given, is $15.56. The plates showing the two methods of disposing of the straw-stacks are a striking reminder of the insistent claims of live stock upon the attention of the man who would combine profitable methods with true citizenship. As compared with

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The Disposal of Straw in the North-West. (2) An unprofitable way.

burning the straw farmers may market it through animals to good advantage and at the same time make possible as good crops in fifty, or a hundred, or two hundred years, as are possible from the virgin soil of to-day.

Number of steers in lot		20
First weight November 1, 1911	lbs.	20,200
First weight, average	"	1,010
Finished weight, 19 steers gross, April 3	"	24,515
Finished weight, average	"	1,290¼
Total gain in 155 days	"	5,325
Average gain per steer	"	280¼
Average daily gain per steer	"	1·8
Average daily gain per lot	"	34·2
Gross cost of feed		$ 528 89
Cost of 100 lbs. gain		9 93
Selling price 7 cts. per lb., live weight, less 5 per cent.		1,630 30
Profit on 19 steers		344 28
Profit per steer		18 12
Profit per steer after covering cost of one loss with feed.		15 56
Average value of steer at start		40 04
Average selling price per steer		85 80
Average increase in value		45 76
Average cost of feed per steer		27 84
Amount of meal eaten	lbs.	25,054
Amount of hay eaten	"	30,580
Amount of green feed eaten	"	22,000
Amount of straw eaten	"	40,000
Amount of salt eaten	"	172

BUILDINGS.

A building for the protection of the threshing separator was erected during the year. This building is twenty-seven feet long by twelve and one-half feet wide.

CORRESPONDENCE.

From April 1, 1911, to March 31, 1912, 4,501 letters were received and 4,033 answered.

MEETINGS ATTENDED.

The Station was represented at the Calgary and Edmonton Exhibitions occupying a tent on the grounds and making an exhibit of an educational nature.

I attended Institute meetings at Clive, Alix, Redwing, Bullocksville, Castor, Stettler, Red Willow, Cumberland, Blackfalds and Lacombe. I also judged and addressed meetings in connection with the Red Deer Horticultural Show, Provincial Seed Fair, Provincial Dairy Convention and judged Standing Crops Competitions at Macleod, Medicine Hat, Stony Plain and Vegerville, and the Good Farms Competition at Leduc and Nightingale. I also attended the Forestry Convention, Seed Growers' Convention, National Live Stock Association and Horticultural Convention at Ottawa in February.

ACKNOWLEDGMENT.

I have pleasure in acknowledging the painstaking and careful work of the Foreman, Mr. S. Edmunds, and others of the staff, who have given good service.

DISTRIBUTION OF SAMPLES.

Twenty-four thousand five hundred seedlings of Manitoba Maple, Caragana and Ash were distributed in the spring of 1911. There are a number ready for distribution in 1912.

There were one thousand and nine samples of potatoes distributed in the spring of 1911, together with two hundred and forty-seven sacks of inoculated soil for alfalfa.

EXTENSION.

The Minister of Agriculture, Hon. Martin Burrell, authorized the extension of this Station by the addition of about three hundred and thirty acres which adjoins the present site on the west and south. The new land was much needed to permit of live stock experimental work being carried on.

METEOROLOGICAL RECORD.

Months.	Highest Temperature. F.	Date.	Lowest Temperature. F.	Date.	Total Precipitation.	Total Hours Sunshine.
1911.						
April	76·0	21st	−11·9	4th	1·15	227·4
May	83·4	5th	24·9	26th	1·51	231·8
June	80·0	16th	34·7	6th	5·62	247·8
July	85·0	25th	33·9	8th	4·39	267·9
August	80·0	18th	29·5	27th	2·63	231·9
September	76·0	2nd	21·5	25th	2·50	176·6
October	80·5	9th	8·7	25th	·62	176·4
November	46·0	2nd	−21·6	11th	·78	107·8
December	46·0	1st	−37·6	31st	·19	86·7
1912.						
January	42·4	22nd	−46·0	10th	·76	103·5
February	46·8	16th	−23·5	29th	·20	119·3
March	54·8	31st	−20·0	2nd	·13	203·7
Totals					20·48	2,180·8

I have the honour to be, sir,
Your obedient servant,

G. H. HUTTON,
Superintendent.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

REPORT OF P. H. MOORE, B.S.A., SUPERINTENDENT.

Agassiz, B.C., March 31, 1912.

J. H. Grisdale, Esq., B. Agr.,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to present herewith the report of the Experimental Farm at Agassiz, B.C., for the year ending March 31, 1912.

The month of April, 1911, was very clear, bright and mild, with but three or four light frosts. The weather turned wet in May and the spring was late but free from the high winds which usually prevail at that season of the year. The summer was on the whole a favourable one; the weather was hot and dry in July and August; the autumn was also dry and exceptionally fine. The winter, although not cold, was wet and there were two severe blizzards, one in November and the other in January. In the November storm, the wind commenced blowing from the north on November 8, increasing to a gale, and ended on the 12th, with two feet of snow, which drifted into heaps. This was followed by rain and a somewhat open month in December followed again by a cold spell in January with snow, which, although the weather was not so cold as in December, remained on the ground for two weeks. February was mild, all the snow disappeared and the ground dried out sufficiently for ploughing to be done. March was an exceptionally fine month, affording an opportunity for much outside work to be done.

TESTS OF VARIETIES OF CEREALS, ROOTS, INDIAN CORN AND POTATOES.

In 1911, there were tested at the Experimental Farm at Agassiz, ten varieties of spring wheat, fifteen varieties of oats, ten varieties of six-row barley, eight varieties of two-row barley, twelve varieties of field peas, nine of Indian corn for ensilage, ten varieties of turnips, eight varieties of mangels, five of field carrots, three of sugar beets and twenty-four varieties of potatoes, of which seventeen are here reported on. The variety tests of grains were conducted this year on land which had grown corn the previous year and had then been disced without ploughing, which did not give as good results as if the land has been ploughed. The roots were grown on clover sod, spring-ploughed land of a sandy loam character. The corn was grown on spring-ploughed rye grass sod. All these were grown without manure. The grains were treated with formaldehyde for the prevention of smut, the strength of the solution being one pint of formaldehyde to forty gallons of water, the grain being soaked therein for twenty minutes and then dried out on the barn floor. The corn was warmed in warm water and about a tablespoonful of pine tar per half-bushel added and stirred into it to keep the crows from picking the seed. The plots of wheat, oats, barley and peas were each 1/50 of an acre and the yields of Indian corn, roots and potatoes were calculated from the product of two 66-foot rows in each case.

Spring Wheat—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	
					In.		In.	Lbs.	Bush.	Lbs.
1	Red Fife	Apr. 15	Aug. 14	121	43	10	3·25	1,290	21	30
2	Early Red Fife (Ottawa)	" 15	" 12	119	43	10	3·25	1,380	23	..
3	Huron	" 15	" 11	118	40	10	3·75	1,080	18	..
4	Stanley	" 15	" 10	117	46	10	3	1,650	27	30
5	Preston	" 15	" 10	117	42	10	4	1,380	23	..
6	Bishop	" 15	" 15	122	41	10	3	1,380	23	..
7	Chelsea	" 15	" 15	122	43	10	3·5	1,260	21	..
8	Pringle's Champlain	" 15	" 14	121	46	10	3·25	1,380	23	..
9	White Fife	" 15	" 13	120	40	10	3·5	960	16	..
10	Marquis	" 15	" 9	116	42	10	3·5	1,140	19	..

Oats—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	
					In		In.	Lbs.	Bush.	Lbs.
1	Swedish Select	Apr. 15	Aug. 5	112	46	10	10	1,560	45	30
2	Abundance	" 15	" 8	115	47	10	11	1,680	49	18
3	Regenerated Abundance	" 15	" 8	115	48	10	11	1,650	48	18
4	Improved American	" 15	" 9	116	46	10	10	1,740	51	06
5	Irish Victor	" 15	" 7	114	47	9	10	1,560	45	30
6	Danish Island	" 15	" 10	117	44	8	9	1,770	52	02
7	Siberian	" 15	" 8	115	46	10	10	1,920	56	16
8	Banner	" 15	" 10	117	49	9	9	1,960	57	22
9	White Giant	" 15	" 8	115	42	10	10	1,740	51	06
10	Pioneer (Black)	" 15	" 5	112	42	8	9	2,100	61	26
11	20th Century	" 15	" 5	112	40	9	10	1,680	49	14
12	Gold Rain	" 15	" 7	114	41	8	9	1,830	53	28
13	Thousand Dollar	" 15	" 9	116	43	9	10	1,500	44	04
14	Lincoln	" 15	" 8	115	46	10	10	2,130	62	22
15	Improved Ligowo	" 15	" 7	114	42	10	10	1,920	56	16

Six-Row Barley—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	
					Ins.		Ins.	Lbs.	Bush.	Lbs.
1	Trooper	April 15	Aug. 3	110	38	8	3	1,500	31	12
2	Manchurian	" 15	July 28	104	40	9	3	1,410	29	18
3	O. A. C. No. 21	" 15	" 28	104	42	8	3	1,320	27	24
4	Nugent	" 15	" 31	107	40	8	2.5	1,440	30	..
5	Stella	" 15	Aug. 7	114	41	9	3	1,560	32	24
6	Yale	" 15	July 31	107	44	10	3	1,320	27	24
7	Mensury	" 15	" 31	107	43	9	3	1,380	28	36
8	Mansfield	" 15	" 31	107	41	9	3·5	1,680	35	..
9	Odessa	" 15	" 28	104	38	8	2·5	1,770	36	42
10	Oderbruch	" 15	" 28	104	43	9	3	1,650	34	18

Two-Row Barley—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Average Length of Straw including Head.	Strength of Straw on a scale of 10 points.	Average Length of Head.	Yield of Grain per Acre.	Yield of Grain per Acre.	
					Ins.		Ins.	Lbs.	Bush.	Lbs.
1	Swedish Chevalier	April 15	Aug. 5	112	45	10	4	1,860	38	36
2	Danish Chevalier	" 15	" 7	114	44	8	5	1,620	33	36
3	Standwell	" 15	" 5	112	45	10	5	1,950	40	30
4	Clifford	" 15	" 4	111	40	9	3·5	1,740	36	12
5	Canadian Thorpe	" 15	" 7	114	47	10	4	1,620	33	36
6	Hannchen	" 15	" 3	110	46	9	4	1,590	33	06
7	Beaver	" 15	" 7	114	41	9	4	1,680	35	..
8	Invincible	" 15	" 9	116	46	10	5	1,770	36	42

Peas—Test of Varieties.

Number.	Name of Variety.	Size of Pea.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Average Length of Straw.	Average Length of Pod.	Yield of Grain per Acre.	Yield of Grain per Acre.	
						In	In.	Lbs.	Bush.	Lbs
1	Prince	Medium	Apr. 20.	Aug. 17.	119	48	3·5	1,440	24	00
2	English Grey	"	" 20.	" 14.	116	53	3·0	1,320	22	00
3	Mackay	"	" 20.	" 16.	118	50	3·5	1,800	30	00
4	White Marrowfat	Large	" 20.	" 15.	117	53	3·0	1,530	25	30
5	Black-eye Marrowfat	"	" 20.	" 18.	120	54	3·5	1,560	26	00
6	Arthur Selected	Medium	" 20.	" 13.	115	50	3·25	1,440	24	00
7	Prussian Blue	"	" 20.	" 14.	116	59	2·75	1,620	27	00
8	Picton	"	" 20.	" 14.	116	53	3·0	1,620	27	00
9	Chancellor	Small	" 20.	" 10.	112	48	2·25	1,770	29	30
10	Golden Vine	"	" 20.	" 17.	119	51	2·25	1,561	26	00
11	Daniel O'Rourke	"	" 20.	" 12.	114	50	2·5	1,440	24	00
12	Paragon	Large	" 20.	" 14.	116	49	3·0	1,380	23	00

Indian Corn for Ensilage—Test of Varieties.

Number.	Name of Variety.	Date of Sowing.	Date of Cutting.	Average Height.	Condition when Cut.	Weight per Acre Grown in Rows.		Weight per Acre Grown in Hills.	
				Ins.		Tons.	Lbs.	Tons.	Lbs.
1	Champion White Pearl	May 29	Oct. 9	94	Early Milk	18	1,185	13	15
2	Selected Leaming	" 29	" 9	86	"	15	1,570	16	1,550
3	Longfellow	" 29	" 9	82	Roasting ears	17	650	18	905
4	Early Mastodon	" 29	" 9	96	No ears formed	15	1,185	15	1,515
5	Wood's Northern Dent	" 29	" 9	80	Ears formed	16	10	16	1,660
6	Eureka	" 29	" 9	79	In Silk	16	505	17	320
7	Angel of Midnight	" 29	" 9	91	Early Milk	16	1,880	17	1,255
8	Compton's Early	" 29	" 9	88	"	17	1,945	18	1,620
9	Superior Fodder	" 29	" 9	85	No ears formed	14	215	15	1,515

Sugar Beets—Test of Varieties.

Number.	Name of Variety.	Yield per Acre. 1st Sowing.		Yield per Acre. 1st Sowing.		Yield per Acre. 2nd Sowing.		Yield per Acre. 2nd Sowing.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
1	Vilmorin's Improved	8	1,820	297	..	9	1,272	321	12
2	French Very Rich	7	1,972	266	12	7	1,312	255	12
3	Klein Wanzleben	8	1,028	283	48	7	784	246	24

Mangels—Test of Varieties.

Number.	Name of Variety.	Yield per Acre 1st Sowing.		Yield per Acre 1st Sowing.		Yield per Acre 2nd Sowing.		Yield per Acre 2nd Sowing.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
1	Prize Mammoth Long Red	9	1,800	330	00	7	784	246	24
2	Gate Post	19	280	638	..	17	1,772	596	12
3	Giant Yellow Globe	12	1,872	431	12	11	1,496	391	36
4	Giant Yellow Intermediate	11	1,892	391	36	9	1.800	330	00
5	Perfection Mammoth Long Red	13	1.984	464	24	12	156	402	36
6	Half Sugar White	20	1,316	688	36	15	1,152	519	12
7	Yellow Intermediate	15	1,152	519	12	13	1,720	426	00
8	Selected Yellow Globe	11	704	378	24	9	1,800	330	00

Turnips (Field)—Test of Varieties. (Both plots pulled Oct. 28.)

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
			Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Carter's Elephant	June 5..	June 19..	10	1,780	363	..	9	348	3 5	48
Perfection Swede	" 5..	" 19..	13	1,192	453	12	11	1,100	385	..
Magnum Bonum	" 5..	" 19..	14	1,040	484	..	15	1,492	524	59
Hall's Westbury	" 5..	" 19..	12	1,344	422	2	15	96	501	36
Halewood's Bronze Top	" 5..	" 19..	14	1,568	492	48	13	1,720	462	..
Bangholm Selected	" 5..	" 19..	13	796	446	36	12	1,476	424	36
Hartley's Bronze	" 5..	" 19..	13	1,456	457	36	15	1,020	517	..
Mammoth Clyde	" 5..	" 19..	14	1,640	484	..	12	288	404	48
Good Luck	" 5..	" 19..	15	624	510	24	9	1,272	321	12
Jumbo	" 5..	" 19..	13	796	446	36	9	1,668	327	48

Carrots—Test of Varieties. (Both plots pulled Oct. 25.)

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
			Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Half Long Chantenay	May 3.	May 17..	15	1,152	519	12	17	1,904	398	24
Mammoth White Intermediate	" 3..	" 17 .	25	424	844	..	20	1,184	686	24
Ontario Champion	" 3 .	" 17..	20	1,184	686	24	20	3.2	673	12
White Belgian	" 3..	" 17..	23	1,256	787	36	20	1,712	693	12
Improved Short White	" 3..	" 17..	27	1,308	921	48	26	1,064	884	24

POTATOES—Test of Varieties. (Planted May 11, Dug Sept. 20.)

Name of Variety.	Average Size.	Quality.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Market-able.		Yield per Acre of Un-market-able.		Form and Colour
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Carman No. 1	Medium	Good	343	12	343	12	247	24	95	57	Round White.
Reeves' Rose	"	Fair	459	6	459	6	367	17½	91	48½	Oval Reddish.
Morgan Seedling	Large	"	354	12	354	12	301	.	53	12	Long Pink.
Rochester Rose	Medium	Good	294	48	294	48	235	20	59	28	Long Rose.
Vick's Extra Early	Small	Fair	182	36	182	36	127	24	55	12	Oblong Pink.
Empire State	Large	"	305	48	305	48	259	15	46	33	Long White.
Irish Cobbler	Small	Good	310	12	310	12	232	30	67	42	Round White.
Dalmeny Beauty	Large	Fair	443	14	443	14	381	00	62	14	Oblong White.
Late Puritan	Medium	Good	327	48	327	48	268	9	59	39	Long White.
Factor	"	Poor	138	36	138	36	104	53	33	43	" "
Ashleaf Kidney	"	Good	347	36	347	36	305	20	42	16	Oblong White,
Everett	"	Fair	393	48	393	48	330	7	63	41	Long Reddish.
Money Maker	Small	Good	369	36	369	36	324	45	44	51	Long White.
Hard to Beat	"	Fair	134	12	134	12	100	30	33	42	" "
Gold Coin	Medium	Good	444	24	444	24	390	43	53	41	Oval White.
American Wonder	Large	"	380	36	380	36	326	48	53	48	Oblong White.
Dreer's Standard	Medium	Fair	313	24	313	24	256	36	56	58	Round White.

TEST OF INDIAN CORN GROWN IN ROWS AT DIFFERENT DISTANCES APART.

(Each grown in four rows 66 feet long.)

Distance Apart of Rows.	Variety.	Weight in Drills Per Acre.		Weight in Hills Per Acre.	
		Tons.	Lbs.	Tons.	Lbs.
21"	Champion White Pearl	29	699	29	1302
	Selected Leaming	28	1322	29	1773
	Longfellow	30	999	30	1464
28"	Champion White Pearl	19	177	18	902
	Selected Leaming	20	1931	21	1985
	Longfellow	27	1189	27	1781
35"	Champion White Pearl	15	1185	13	15
	Selected Leaming	15	1570	16	1550
	Longfellow	17	650	18	905
42"	Champion White Pearl	12	512	10	317
	Selected Leaming	12	1859	14	991
	Longfellow	14	331	14	943

For silage the Longfellow was far in advance of the other varieties. The corn sown the two shortest distances apart, twenty-one and twenty-eight inches, although giving a heavier yield per acre, had much thinner stalks, filled with water, making it of much less value than the corn sown at thirty-five and forty-two inches apart. There were only a few stalks in the two former cases which tasselled out, with no sign of ears. The thirty-five and forty-two inch rows and hills has ears fairly well developed.

The labour of cultivating was very much greater in the drills than in the hills, and that required to cultivate the corn when sown at the shorter distances apart was too great to be practicable.

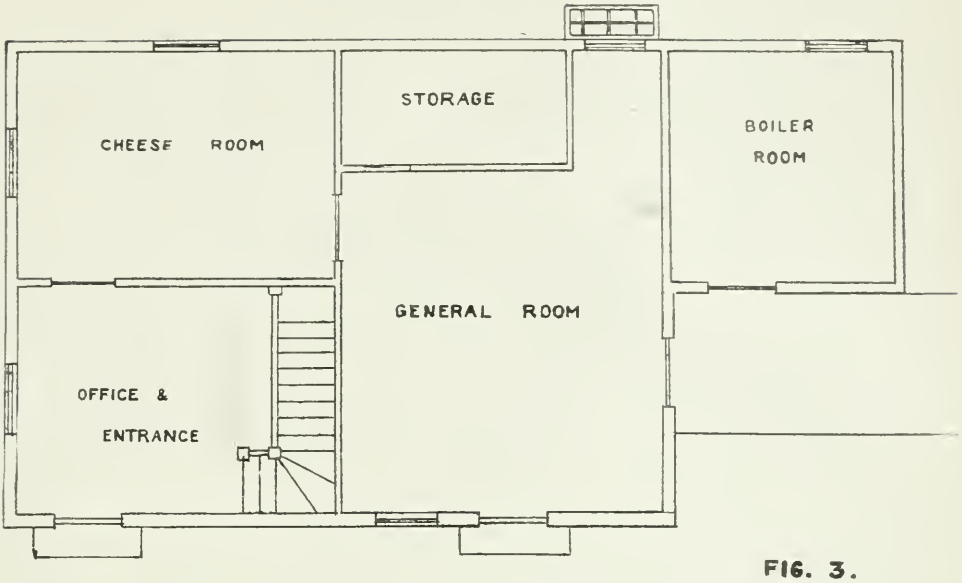
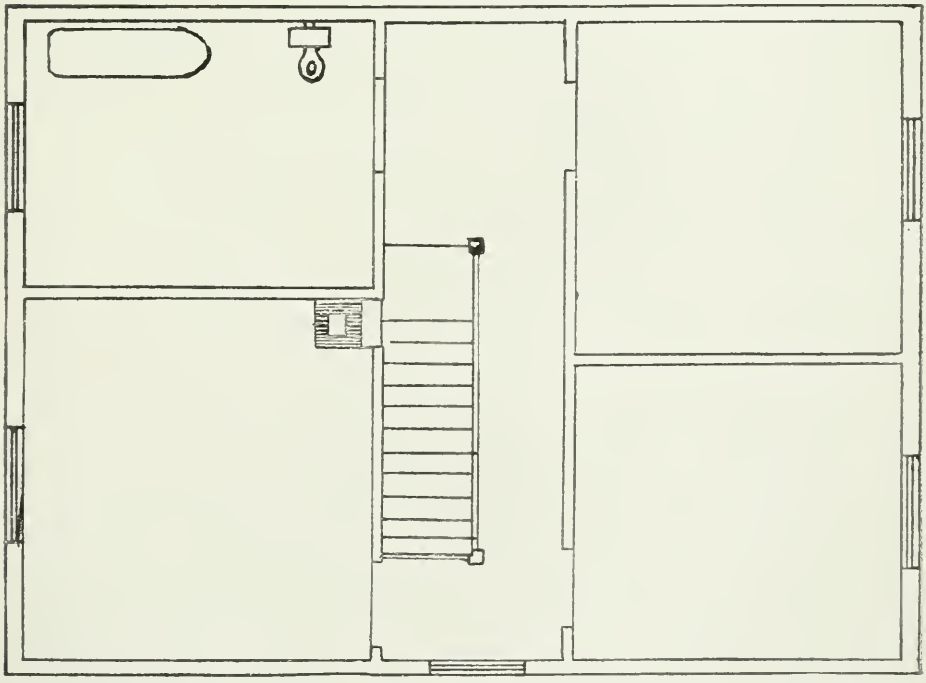


FIG. 3.

Ground Floor.



First Floor.

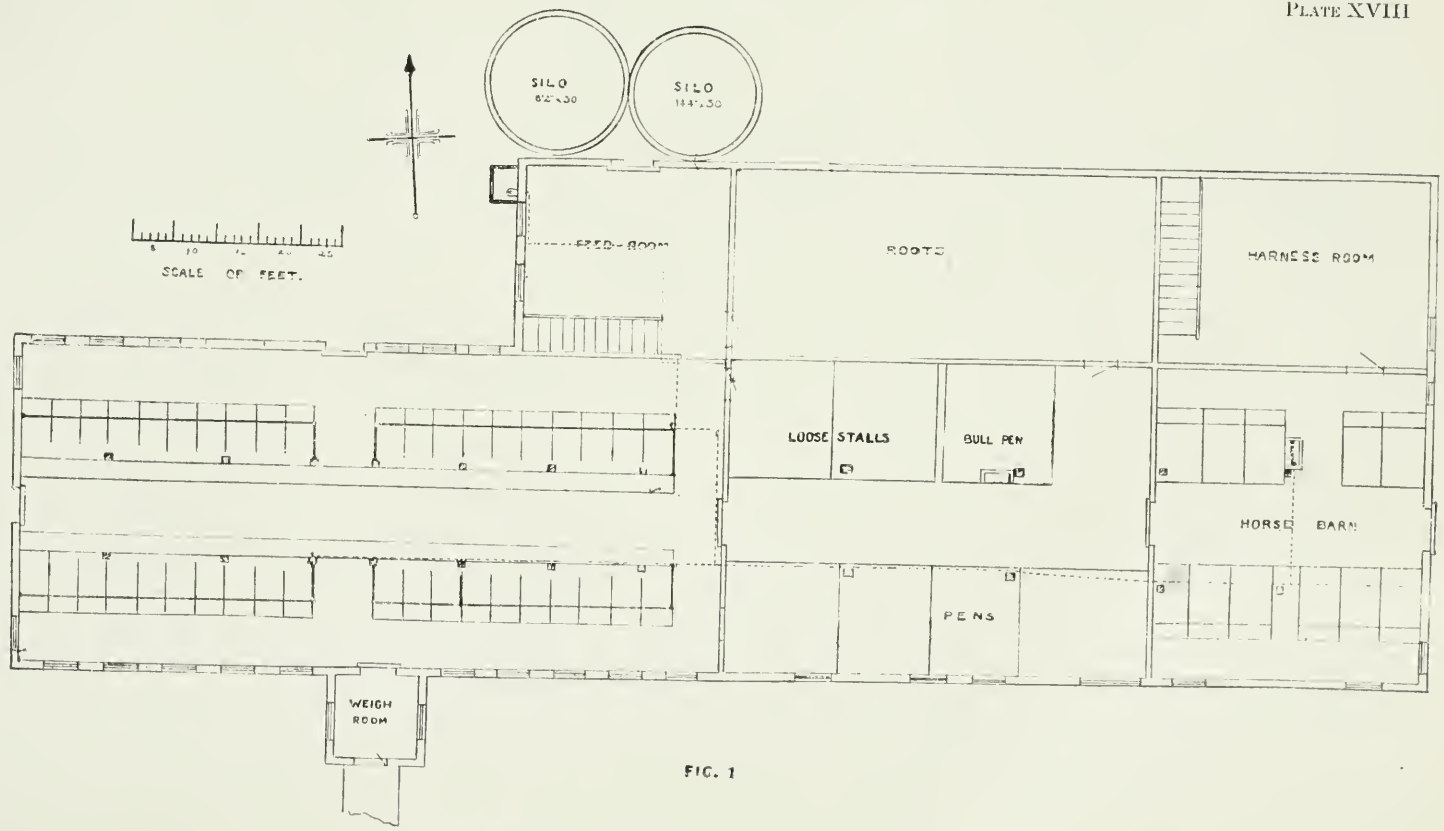
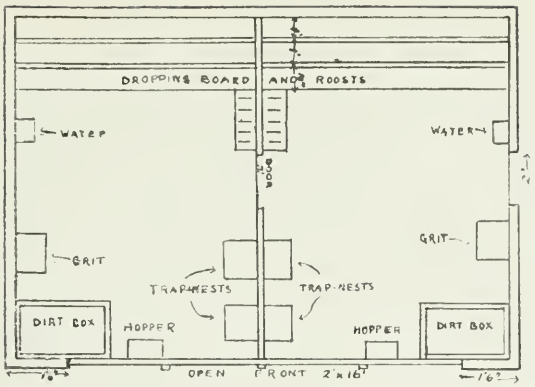


FIG. 1

Ground Floor Plans of Cattle and Horse Barns, Experimental Farm, Agassiz, B.C.



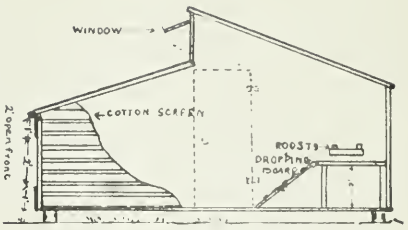
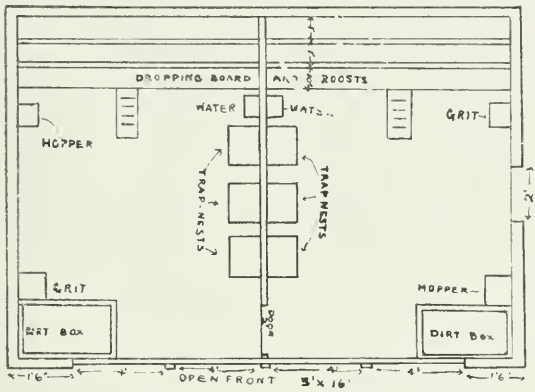


FIG. 1



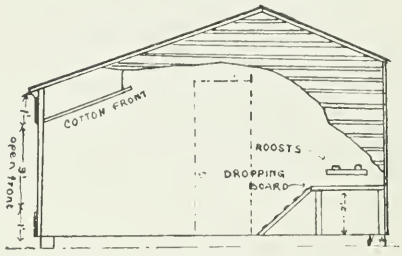
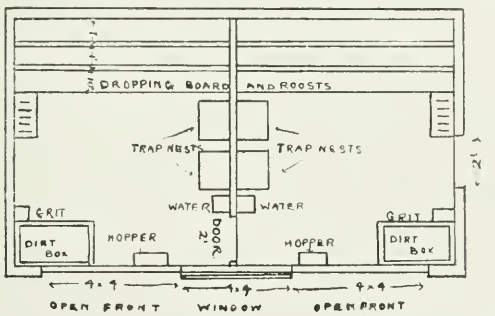


FIG. 2



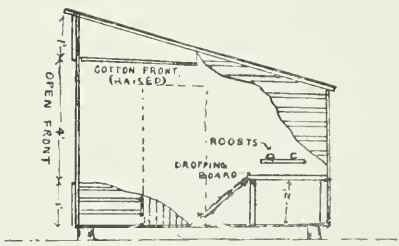


FIG. 3

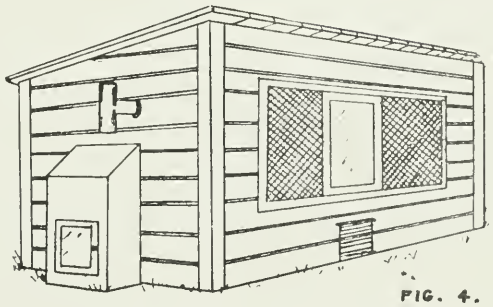
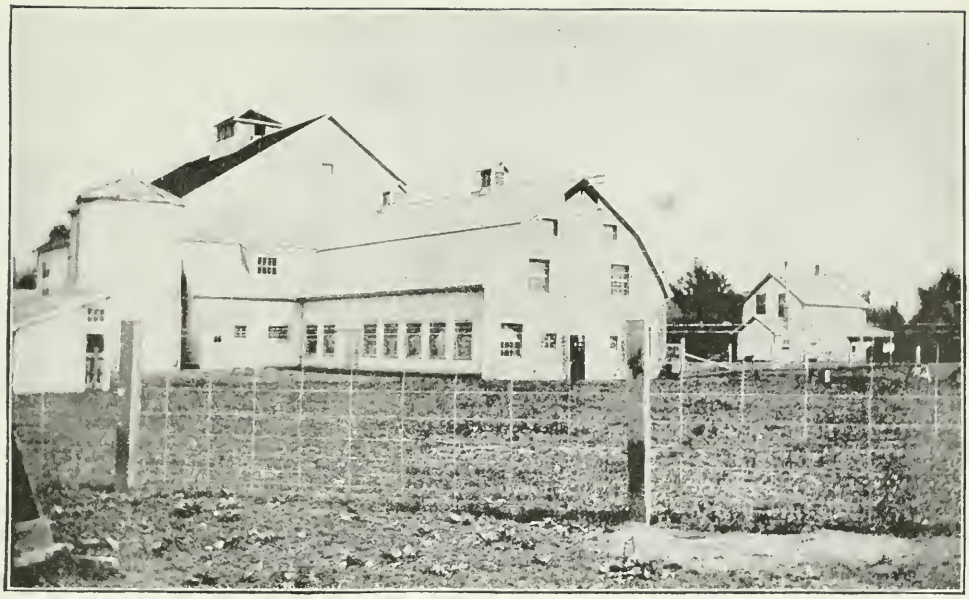
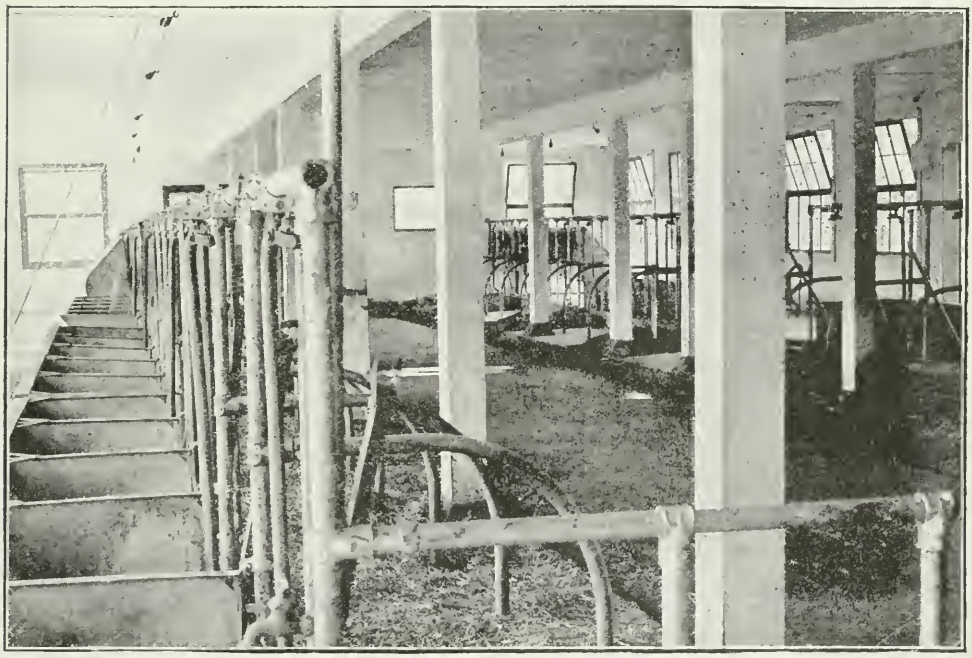


FIG. 4.

Four Types of Poultry House in use on the Experimental Farm, Agassiz, B.C.



Group of Farm Buildings and Dairy, Experimental Farm, Agassiz, B.C.



Interior of Cow Barn, Experimental Farm, Agassiz, B.C.

FARM ROTATION.

An attempt is being made to get the whole Farm under a four-year rotation and also to get it divided into four as nearly equal sections as possible, both in respect to the cleared and uncleared land. Under the orchard system practised heretofore, this was impossible and as a result, some parts of the Farm are very poor in fertility. For this season, the land in some of the sections varied greatly, the supply of manure available was small and the crops were not what they should have been. The coming year should show some improvement, but not much can be expected, as the cattle referred to further on in this report came late and all the hoed crops are on land that has never been manured. When the cycle of the rotation has once been completed, results should be much more favourable. This four-year rotation is as follows:—

First year.—Grains, seeded down to Red Alsike, White Dutch clover and Rye grass.

Second year.—Hay.

Third year.—Pasture. In fall plough early and late, cultivate, manure.

Fourth year.—Hoed crops. Mangels, corn, potatoes.

The hoed crops on the Agassiz Farm are chiefly corn, mangels and potatoes. In corn, Longfellow and Angel of Midnight do best, and are usually planted in checks three feet each way. In mangels, Mammoth Red and Giant Half Sugar White are preferred. About twenty-four varieties of potatoes are grown for sale and a small acreage for distribution.

As a main grain crop, a mixture of oats, peas, barley and wheat is sown. Last year, these were mixed in the proportion by measure of 4, 1, 1, 1, in the order named above and sown at the rate of 2½ bushels per acre. Good results were obtained and the same mixture will be used again, but, in the meantime, an experiment will be carried on with some plots of different mixtures so as to learn which is best suited to our local conditions. In seeding down, 9 lbs. Common Red clover, 3½ lbs. Alsike and 1½ lbs. white Dutch clover along with 1 lb. Italian rye grass were used, per acre. This mixture was tried last season and gave a much thicker stand for hay or pasture than Common Red clover and Rye grass alone.

The greatest difficulty here in the farm operations is the shortage of manure which, however, will be overcome in time, as this year from the time the cattle came in December until March 31, we got one hundred and thirty-five tons fifteen hundred and eighty-five lbs. from the cows, calves and horses.

SUMMARY OF CROPS.

	Tons.	Lbs.
Hay, mixed	106	1730
Roots—		
Mangels	26	1400
Carrots	3	800
Beets	2	400
Turnips	12	500
Potatoes	4	1600
Corn for silage	207	1530
Grain—		Bush.
Peas		183½
Barley		45
Wheat		73
Seed oats		127
Mixed peas, oats and barley and wheat		705
		1133½

Part of the hay was Red clover, Italian Rye and Orchard grass. About 27 tons were taken from an old pasture field which had a light mixture of clover, rye grass, native grasses, ferns and weeds.

VEGETABLES.

During the past season the vegetable work at this Farm did not receive the attention that perhaps it should, as we had to depend entirely upon unskilled labour. The spring was cold, and the summer dry, and not conducive to the growing of large crops, especially when only very ordinary attention could be given this branch of the work. The cabbages, cauliflower, Brussels sprouts and turnips were almost entirely eaten by white maggots, and only a very few heads matured. The citrons and watermelons and also the peppers did not mature at all.

Vegetable and date of Harvesting.	Variety.	Received from	Date of Sowing.	Date of Germination.	Ready for Use.	Quantity Sown.	Amount Harvested.
Onions, October 21, 1911.	Yellow Globe Danvers	Vilmorin..	April 22..	May 13..	.....	60 ft..	3¼ lbs.
	Johnson's Dark Red Beauty	Johnson..	" 22..	" 13..	.....	60 "	6½ "
	Yellow Globe Danvers	Ont. Seed Co.	" 22..	" 13..	.....	60 "	1½ "
	Salzer's Wethersfield	Salzer..	" 22..	" 13..	.....	60 "	9 "
	Large Red Wethersfield	Ont. Seed Co.	" 22..	" 11..	.....	60 "	3 "
	Southport Red Globe	Ont. Seed Co.	" 22..	" 11..	.....	60 "	5½ "
	Large Red Wethersfield	Vilmorin..	" 22..	" 13..	.....	60 "	13 "
Radishes, June 17, 1911	Rosy Gem	Ont. Seed Co.	" 22..	" 5..	June 1..	30 "	8 oz.
	Non plus ultra	Ont. Seed Co.	" 22..	" 5..	" 1..	30 "	1¼ lbs.
	Forcing Turnip Scarlet	Vilmorin..	" 22..	" 5..	" 1..	30 "	1¼ "
	White Icicle	Ont. Seed Co.	" 22..	" 5..	" 1..	30 "	2 lb. 6 oz.
	Turnip, Early Scarlet, White Tipped.	Vilmorin..	" 22..	" 5..	" 10..	30 "	1 " 13 "
Lettuce, July 22, 1911 to August 9, 1911	Grand Rapids	Ont. Seed Co.	" 22..	" 9..	.....	15 "	Did not germinate.
	Hanson	Ont. Seed Co.	" 22..	" 6..	Aug. 9..	15 "	5 lbs.
	May King	Ont. Seed Co.	" 22..	" 6..	.....	15 "	Seeded before fit for market.
	Improved Hanson	Thorburn.	" 22..	" 20..	" 3..	15 "	4½ lbs.
	Black Seeded Simpson	Thorburn.	" 22..	" 20..	.....	15 "	Did not germinate.
	Crisp as Ice	Vicks 1911	" 24..	" 5..	July 28..	15	7½ lbs.
	Giant Crystal Head	Thorburn.	" 24..	" 5..	" 22..	15 "	6½ lbs.
	Grand Rapids	Thorburn.	" 24..	" 5..	" 19..	15 "	6½ "
	Iceberg	Burpee..	" 24..	" 5..	" 19..	15 "	6½ "
	Wheeler's Tom Thumb	Vilmorin..	" 24..	" 5..	" 29..	15 "	6½ "
	Red Edged Victoria	Vilmorin..	" 24..	" 6..	" 22..	15 "	4¼ "
	All Heart	Dreer ...	" 24..	" 6..	" 22..	15 "	6¾ "
	Cos Trianon	Vilmorin..	" 24..	" 6..	" 22..	15 "	10 "
Turnips	One variety planted, entirely destroyed by maggots.						

Vegetable and date of Harvesting.	Variety.	Received from	Date of Sowing.	Date of Germination.	Ready for Use.	Quantity Sown.	Amount Harvested.
Parsley.	Double Curled.....	Thorburn.	April 27..	May 30..	. .....	30 "	Not harvested, but very good yield.
	Double Curled.....	Thorburn.	" 19 .	" 30..	.....	30 "	
Carrots, October 21, 1911.	Ox Heart.....	Ont. Seed Co.	April 24..	" 20..	Sept. 1..	30 "	26 lbs.
	Chantenay.....	Ont. Seed Co. ...	" 24..	" 20..	" 1..	30 "	18 "
	Half Long Chantenay	Vilmorin..	" 24..	" 20..	" 1..	30 "	67 "
	Nantes.....	Ont. Seed Co. ...	" 24..	" 20..	" 1 .	30 "	15 "
	French Horn.....	Vilmorin..	" 24..	" 20..	" 1..	30 "	40 "
Beets, Oct. 21, 1911	Meteor.....	Johnson. .	" 24 .	" 13 .	" 1..	30 "	40 "
	Black Red Ball.....	Burpee. ..	" 24..	" 18..	" 1..	30 "	19 "
	Ruby Dulcet.....	Johnson. .	" 24..	" 13..	" 1..	30 "	55 "
	Eclipse.....	Ont. Seed Co . . .	" 24..	" 18..	" 1..	30 "	48 "
	Egyptian.	Ont. Seed Co.	" 24..	" 18..	" 1..	30 "	55 "
	Early Blood Red Turnip.....	Vilmorin..	" 24..	" 18..	" 1..	30 "	44 "
	Egyptian Dark Red Flat..	Vilmorin..	" 24..	" 18..	" 1..	30 "	12 "
Parsnips, October 21, 1911.	Hollow Crown.....	Graham...	" 24..	" 6..	" 1..	30 "	17 "
	Hollow Crown.....	Ont. Seed Co.	" 24..	" 6..	" 1..	30 "	30 "

Vegetable and Date of Harvesting.	Variety.	Received from.	Date of Sowing.	Date of Germination.	Quantities Planted.	Number of Pickings.	Amount Harvested	
					Feet.		Lbs.	Oz.
Beans— July 18, 1911 to Sept. 30, (All Dwarf Varieties). .	Refugee....	Ont. Seed Co	April 24..	May 17...	30	6	26	10
	Refugee or 1000 to 1.	Henderson..	" 24..	" 17...	30	7	28	14
	Davis Wax.....	Ont. Seed Co	" 24..	" 17...	30	6	8	31
	Red Valentine... ..	"	" 24..	" 17...	30	7	13	11
	Stringless Green Pod	Burpee.	" 24..	" 13...	30	6	10	2
	Wardwell's Kidney..	Ont. Seed Co	" 24..	" 13...	30	1	1	10
	Challenge Blackwax.	C.E.F., 1911	" 24..	" 13...	30	7	6	14
	Hodson Wax.....	Ont. Seed Co	" 24..	" 17...	30	8	14	12
	Flageolet or Giant Wax.	"	" 24..	" 17...	30	7	10	4
	Valentine	Torburn....	" 25..	" 17...	30	9	16	1
	Wardwell's Kidney Wax.....	"	" 25..	" 17...	30	3	2	6
	Early Refugee.....	"	" 25..	" 17...	30	7	10	10

Vegetable and Date of Harvesting.	Variety.	Received from.	Date of Sowing.	Date of Germination.	Date of Blooming.	Quantities Planted.	Number of Pickings.	Amount Harvested.
						Feet.		Lbs. Oz.
Peas—								
July 10 1911, to August 12 1911..	McLean's Advancer.	Thorburn..	April 25	May 6..	June 18	30	6	8 10
	Sutton's Excelsior..	Dreer	" 25	" 6..	" 10	30	5	7 6
	Thomas Laxton.....	Bovee.	" 25	" 6..	" 10	30	3	5 1
	Stratagem.....	Thorburn...	" 25	" 6..	" 24	30	5	8 7
	Gregory's Surprise..	Gregory....	" 25	" 6..	" 10	30	3	8 3
	Premium Gem.. ...	Thorburn...	" 25	" 6..	" 10	30	4	8 4
	Juno	" ...	" 25	" 6..	" 24	30	5	7 14
	Telephone.....	" ...	" 25	" 6..	" 24	30	4	4 2
	American Wonder..	" ...	" 25	" 6..	" 12	30	5	6 5
	Heroine..	" ...	" 25	" 6..	" 24	30	7	9 12
	Gradus.....	Burpee.....	" 25	.....	" 10	30	3	6 11
	Chinese Golden.....	....	" 22	May 1..	" 19	30	1	1 8

Vegetable and Date of Harvesting.	Variety.	Received from.	Date of Sowing	Date of Germination.	Date of Blooming.	Amount Planted.	Height.	Amount Harvested.
						hills. ft.	Ft. In.	Lbs. Oz.
Sweet Corn—								
Sept. 18 1911								
1	Golden Bantam.....	Burpee.	May 22	June 1..	July 25	20 60	4 2	16 0
2	Early Evergreen....	Dreer	" 22	" 1..	" 27	20 60	5 6	15 19
	Black Mexican.....	Rennie.	" 22	" 1..	Aug. 7	20 60	5 6	
	Stowell's Evergreen.	Graham.....	" 22	" 1..	" 9	20 60	6 .	
3	Henderson's Metropolitan.	Henderson..	" 22	" 1..	July 29	20 60	5 6	15 17
	Country Gentleman.	Burpee.	" 22	" 1..	Aug. 10	20 60	6 6	
4	Fordhook Early.....	"	" 22	" 1..	July 27	20 60	4 6	13 14
5	Devitt's Early	Ont. Seed Co	" 22	" 1..	" 25	20 60	3 6	23 17
	Stowell's Evergreen.	"	" 22	" 1..	Aug. 9	20 60	5 6	
6	Early Malakoff.....	C.E.F.....	" 22	" 1..	July 25	20 60	3 6	16 16

1. Quality good.
2. Green, fair, long cobs.
3. Good quality and shape.
4. Poor no flavour.
5. Good quality and shape.
6. Too ripe, well filled, good corn.

Vegetable and Date of Harvesting.	Variety.	Received from.	Date of Sowing.	Date of Germination.	Date of Ripening.	Amount Planted.	Amount Harvested
						Hills.	Lbs.
Squash— Oct. 31, 1911.							
	Long White Bush Marrow	Vilmorin.	May 22	May 29	July 21	3	66
	White Congo	"	" 22	" 6	Aug. 15	3	5½
	Mammoth White	"	" 22	" 29	" 1	3	45
	Hubbard	"	" 22	" 29	" 4	3	30
	Delicata	Thorburn	" 22	" 29	July 21	3	86
	Summer Crookneck	Rennie	" 22	" 29	" 22	3	57
	Long Vegetable Marrow	Vilmorin.	" 22	" 29	" 26	3	217
	Custard Marrow White Bush	"	" 22	" 29	" 26	3	104
Tomatoes— Harvested Green Oct. 18 1911.							
	Greater Baltimore	Ont Seed Co	April 17	June 3	July 27		36
	Livingstone Globe	Thorburn	" 17	" 3	" 21		38
	Chalk's Early Jewel	Ont Seed Co	" 17	" 3	" 24		24
	Earliana	"	" 17	" 3	" 21		29
	First of All	"	" 17	" 3	" 21		22
	Rennies XXX Earliest	Wm. Rennie	" 17	" 3	" 10		37
	Spark's Earliana	C.E.F. 1910.	" 17	" 3	" 21		16
	Trophy	Dreer	" 17	" 3	" 25		19
	Spark's Earliana	Burpee	" 17	" 3	" 21		19
	Bonny Best	Harris	" 17	" 3	" 25		13
	North Adirondack Earliana	Langdon	" 17	" 3	" 10		28
	Plentiful	Ont Seed Co	" 17	" 3	" 24		8
	Florida Special	Bogliano	" 17	" 3	" 24		12
	Matchless	Burpee	" 17	" 3	" 24		9
	Chalk's Early Jewel	"	" 17	" 3	" 24		8

EXPERIMENTAL HEDGES AT THE DOMINION EXPERIMENTAL FARM, AGASSIZ, B.C.

Name.	Height.		Width.		Condition.	Injury. Winter Kill.	Remarks.
	Ft.	Ins.	Ft.	Ins.			
1. Deutzia	3	5	3	5	Good		Somewhat mossy.
2. American Arbor-Vitæ	4		6		"		
3. Pyramidal Arbor-Vitæ	4	5	3			By snow.	
4. Deutzia	3		2		Poor.		Failure.
5. Californian Privet	6	5	5		Good		Mossy.
6. Deutzia	7		4	5	"		
7. "	3	5	2		Fair.		Poor hedge.
8. Irish Juniper	4		4		Poor.	Somewhat	Half a hedge.
9. Swedish Juniper	3		4	5	Good	Some 10 ins.	Part good.
10. Syringa	4	5	3		Fair.		Mossy.
11. Thunberg's Barberry	4		4	8	Good		Somewhat mossy.
12. Berberis Amurense	4	5	2		Poor.		
13. Acer Ginnala	6		4	5	Good		
14. Mixed Deutzia	5		4	6	"		Somewhat mossy.
15. Removed.							
16. Red Honeysuckle	7		4	6			Very mossy.
17. Japanese Quince	4		4		Fair.		Scraggly & mossy.
18. Removed.							
19. Removed.							
20. Hemlock	4	6	4	6	Good		Good.
21. Golden Arbor-Vitæ	3		3		"	By snow somewh't.	"
22. Calycanthus Floridus	6	6	4	6	Poor	Badly broken	Very scraggly.
23. " "	6	6	6		Good		Mossy.
24. Yew	1			9	"		Young, one year.
25. (Thorn)	2	6	1	6	Poor.	Badly broken	Cut down, 1911.
26. Norway Spruce	3		3	6	Good		
27. " "	4		5	6	"		
28. European Holly	4	6	5		"	Snow damage	Some broken.
29. " "	6		4	5	Fair.	" "	Badly "
30. Forsythia	4		4		Poor.	" "	Should be lifted.
31. Deutzia	4		2		"	" "	Cut down, 1911.
32. Retinospora Squarrosa	3		3	6	Fair.		A little blighted.
33. Yew	3		3	6	Good		
34. Californian Privet	4	6	5		"		Mossy.
35. Black Thorn	2	5	2	5	Fair.	Snow damage	Cut in 1911.
36. Ilex aquifolium ferox						Badly broken	
37. Pine, removed							A few bushes.
38. Golden Willow	4		4		Good	Snow damage	
39. Rosemary-leafed Willow	1	6	2		"	" "	Badly broken.
40. European Beech	3		4		"		
41. Box Tree	1			6	Fair.		1 year old.
42. English Thorn	5		4		Good		
43. Birch, removed.							
44. Acer Campestre	5		5		Good		
45. Birch, removed.							

CATTLE.

On April 1, 1911, there were on hand a herd of pure-bred Shorthorns, consisting of twenty females, young and old, one stock bull and four young bulls. During the month, four fat cows which were non-breeders, were sold to the butcher and later on in the summer the rest of the herd was sold to a rancher in the upper country. All were tested before sale and found free from tuberculosis.

In December, 1911, twenty-eight grade Holstein cows and one pure-bred bull calf of the same breed, bought under your direction in Eastern Ontario, were received here. They arrived in fair condition, nearly all being dry, one having calved on the cars *en route*.

They were put in and fed at first on mixed hay 15 lbs., clover silage 20 lbs., roots 10 lbs., mixed grain 4 lbs., with salt once a day and water twice a day in the mangers. This ration was continued until they were well up in condition, when their feed was changed to corn silage which was increased to 45 or 50 pounds per day, depending upon the cow. The meal ration was lowered to one and one-half pounds of bran per day. They were weighed once each month and, with very few exceptions, made most substantial gains and all that calved were in first-class condition at that time. After calving they were fed about the same roughage and, depending somewhat on the cow, they got one pound of mixed grain, valued at 1·6 cents per pound for every three or four pounds of milk given. This gave us the results tabulated below. Taken from January 1 to March 31, these figures are actual results and worth only what they represent, which is the first period of lactation of cows after a long train trip and before being acclimatized. Cows 9, 27 and 28 would not be comparative as we do not know exactly how long they have been milking.

Records of Dairy Herd.

No. of Cow.	Date of Calving.	Calf Dropped.	Value of Calf when Born.	Days Milking.	Amount of Meal Eaten.	Amount of Silage and Roots Eaten.	Amount of Hay Eaten.	Total Value of Feed.	Pounds of Milk Produced.	Cost to Produce 100 lbs. Milk.	Value of Skim Milk at 25 cts. per 100 lbs.	Gain or Loss in Live Weight.
			$ cts.		Lbs.	Lbs.	Lbs.	$ cts.	Lbs.	$ cts.	$ cts.	
2	December 4th, 1911	Heifer	10 00	91	840	4,550	1,365	30 69	2,785	1 10·29	6 26	Gain.
3	January 28th	Bull	5 00	65	806	3,250	975	25 07	2,718	92·23	6 14	Loss.
5	March 1st	"	5 00	31	312	1,550	465	10 79	938	1 15·03	2 11	"
6	February 26th	"	5 00	35	528	1,750	525	14 99	1,584	94·63	3 56	"
7	January 20th	"	5 00	72	834	3,550	1,065	26 64	2,883	92·40	6 33	Gain.
8	March 1st	"	5 00	31	389	1,550	465	12 02	1,169	1 04·53	2 63	Loss.
9	In calf			75	551	3,750	1,125	22 86	1,460	1 56·57	3 28	"
10	February 24th	Heifer	10 00	37	464	1,850	555	14 35	1,394	1 02·94	3 13	Gain.
11	January 2nd	Bull	5 00	89	869	4,450	1,335	30 50	3,061	99·64	6 88	"
12	January 21st	"	5 00	70	877	3,500	1,050	27 15	3,034	89·48	6 82	Loss.
13	March 15th	Heifer	10 00	16	261	800	240	7 17	784	91·45	1 76	"
16	February 13th	"	10 00	47	706	2,350	705	20 09	2,120	94·76	4 77	"
17	March 17th	Bull	5 00	14	216	700	210	6 07	634	95·74	1 40	Gain.
19	March 6th	Heifer	10 00	25	536	1,250	375	10 05	1,008	99·70	2 27	Loss.
22	March 19th	"	10 00	12	163	600	180	4 85	490	98·97	1 10	"
24	January 26th	"	10 00	65	685	3,250	975	23 14	2,210	1 04·70	4 97	Even.
25	March 8th	"	10 00	23	339	1,150	345	9 72	1,017	95·57	2 29	Loss.
27	Aborted November 18th, 1911			91	717	4,550	1,365	28 52	2,086	1 36·72	4 67	Gain.
28	Aborted November 21st, 1911			75	519	3,750	1,125	22 35	1,284	1 74·06	2 89	"

By March 31, 50 per cent of the calves that came were bulls, but as we do not know anything of the back breeding of any of the cows, we are raising all the heifers and are turning off the bulls as veal.

The heifer calves are all dehorned when they are four or five days old, by clipping the hair off the nubbin, damping slightly and rubbing caustic potash on. At this age the calf does not mind it and the results are entirely satisfactory.

The young heifers are fed on whole milk after having one or two feeds from their dam while in a loose box with her. They are given about a gallon of milk per day at first, gradually increased to a gallon and a half at three weeks, then as the calf begins to eat oats and bran, the whole milk is gradually supplemented with skim milk, until at twelve to sixteen weeks they are on skim milk exclusively, bran, oats, roots and silage and what hay they will eat. They are kept in light, airy stalls in the old barn, well bedded with cut straw, and are cleaned out as soon as the bedding gets soiled. Once every ten days or so, all the litter is cleaned out of the pens, and the walls sprayed with a light disinfectant to keep down any lice or vermin. There has been no trouble with them of any nature and the calves are strong growing youngsters, full of life but not fat.

The routine of work in the stables is as follows: Milking in the morning starts at 5.15, followed with a very light feed of hay while the men are away at breakfast. Then feeding of silage and roots, upon which the grain is put and a pinch of salt, after which water is given. While the feeding is going on, the stables are cleaned, fresh bedding put down and by 10.30 the floors are all swept. On all fine days the cows are turned out in the yard where they can lie down and get water as they wish, or, if it is damp, they come in after 1 o'clock and rest in the stable. All odd jobs are done before 3.00 in the afternoon, when the cows are again fed silage roots and grain. The cows are then cleaned up for milking which starts at 4.30, after which they are watered, given what hay they will eat and their beds fixed up for the night. After supper all hay thrown out is placed in the mangers and they are left to rest and ruminate until morning.

HORSES.

At present there are on hand two heavy draft teams, purchased this spring, one team being three-quarter-bred Clydes, mare and gelding, weighing 3,500, four years old, the other team being half-bred Clydes, mare and gelding, six years old, weighing 3,300; these weights are of the horses in medium to thin flesh. We have also two teams of light draft geldings, 2,800 and 3,000, and aged, and one general purpose mare, 13 years old and somewhat crippled. One heavy draft gelding was disposed of last fall; he was bought in 1889 and was worn out, having served his time of usefulness. Two broken-winded and otherwise crippled geldings, weighing about 2,600 pounds, were sold during the winter.

The teams were kept busy during the winter on all kinds of work whenever it was possible to get them out. They are all in good condition, and at the time of writing, standing the rush of spring work well.

SHEEP.

At the beginning of the year there was on hand a flock of 20 ewes and 4 lambs, all of the Dorset Horned breed. During September an addition was made to the flock in the shape of a ram lamb bought by you. He has turned out to be an excellent specimen of the breed and is in prime condition. Last year we sold three old ewes as mutton, and two ewe lambs and two buck lambs were sold as wethers, on account of their being inbred to too great an extent, and in the coming spring we will sell another old ewe as a non-breeder.

All the other ewes had lambs in the early spring of 1912. As one aborted and two others gave birth to full-grown dead lambs, this leaves us a crop of 16 lambs, four of which are ewes and the remaining twelve, rams.

The sheep were pastured on a piece of waste land, all summer, and not having had lambs, were very fat in the fall. We have been very fortunate in not having had any trouble with either wild beasts or dogs, and as our pastures are now arranged to avoid this to a great extent, we hope to have overcome this difficulty.

The following is a statement of the expenditure and of the income derived from the flock last year:—

Feed during the winter—		
Hay at $15 per ton, 750 lbs.	$ 5 62	
Roots at $3 per ton, 3,150 lbs.	4 72	
Mixed grain at $32 per ton, 1,320 lbs.	21 12	
Salt.	1 00	
		$32 46
186 lbs. wool at 9½ cents per lb.	$19 67	
4 lambs at $6.	24 00	
3 ewes.	37 83	
		81 50
Profit excluding labour.		$49 04

We have also to the credit of the flock, 16 lambs of varying ages, and one non-breeding ewe. Although the sheep were visited almost every day, the labour attached to them was very small until December, and from then till lambing time, which started early in February. This is a branch of farming which seems to pay exceptionally well for the capital invested, when once put on a running business basis.

The average period of gestation during 1911-12 was 148·5 days.

SWINE.

Although no experimental work has been done with swine this year, we have maintained two small pure-bred herds as breeders, namely Yorkshire and Berkshire. The best of the litters were registered and sold as breeding stock to people in the province, and those that did not come up to the standard at from ten to twelve weeks of age were turned off later as butcher hogs. Up to date the demand for breeding stock of both breeds has exceeded the supply by 65 per cent, the demand for either sex being about equal.

Before December no milk was available and it was more expensive trying to raise and fatten hogs on grain, roots, pasture or green feed, than it has been since that date when a quantity of skim milk has been fed.

All boars and sows are run on clover pasture and either sleep in the piggery or in 'A'-shaped cabins. We have found the cabin method to be most satisfactory in this district.

With an increase of accommodation we could most profitably increase our herds and do some breeding and feeding under British Columbia conditions, which should prove of value.

At the beginning of the year, there were three Yorkshire sows and one aged boar of the same breed and a small number of young pigs of all ages and sizes: one Berkshire boar and one crippled sow with a litter of six. This sow was lost at farrowing time later on in the year, and an unborn litter of eleven with her.

At present there are on hand in Yorkshires, one boar (Summerhill Jerry 21st —28494) three years old, weight in breeding condition, 650 lbs. Two sows (Maid of Kent 7th—31958) two and a half years old, weight in breeding condition five hundred

pounds, and (Claribel 40th—26604) four years old, breeding weight four hundred and seventy pounds. There are also two young sows, daughters of Maid of Kent, which we are keeping as breeders, but they are not yet old enough to be registered. In the Berkshire stock there are one boar (Ottawa Chance 52nd—26741), ten months old, weight in breeding condition two hundred and sixty pounds, and two sows (Ottawa Luck 55th—26744), eleven months old, weight in breeding condition two hundred and thirty pounds, and (Ottawa Irene 4th), ten months old, weight in pig two hundred pounds.

All the Berkshires are young and were received from the Central Experimental Farm at Ottawa in December, 1911. They are excellent specimens of the breed, and a young sow or two will be kept from them as breeders.

The income from the swine for the year has been:—

Yorkshires sold for breeding	$125 00
Berkshires sold for breeding	50 00
Sold as butcher hogs	194 50
Services of boars at $1.00	11 00
Total	$380 50

POULTRY.

In the spring there was a small pen each of Barred Plymouth Rocks, Black Minorcas, Rhode Island Reds, Buff Orpingtons and White Wyandottes; these five breeds were kept separate and eggs from them sold for hatching. About one hundred and twenty-five chickens were hatched of the various breeds, under hens. They were kept in a continuous house with a small pen each and a small yard outside. In the summer, after the breeding season was over, they were allowed to run at large, which method, however good for hens, was not good for the other branches of the Farm.

During the summer, the old hen-house, which was on the site of the new barn, had to be hauled away, and three small houses, of the Wood's, Tolman's and Gilbert's Cotton Front types respectively, were erected on a piece of land, about two acres, which included the nut orchard, and which was set apart and fenced with a cheap but practical and permanent fence. Each of the houses was divided into two pens, and, in the fall, pens were started of the various breeds. The White Wyandottes, which were not very good specimens of the breed, were disposed of, and, owing to the popularity of the breed on this coast, a S. C. White Leghorn pen, comprising ten females one year old and a cockerel were purchased. We also purchased a fresh pen of Barred Plymouth Rocks and a cockerel. The oldest birds of the original pens were disposed of and supplemented with pullets of the year's hatching. These pens were kept during the winter on known rations, such as are given below, and an exact record kept of the number of eggs laid per pen. In the case of the younger pens, the birds were trapnested, records of each bird being kept to permit of the selection of the best breeding stock in the spring.

Early in the spring, a yard was built for each pen of birds and the best layers selected and put with a cock for the breeding season. Three small incubators were purchased, namely, the Tamlin's Nonpareil, the Jubilee and the Prairie State.

During the cold spell in the winter, which lasted about a month or six weeks, all the pens had to be equipped with cotton fronts on account of the drifting snow and the winds. One storm, coming earlier than usual, almost completely covered some of the houses, but the cotton fronts prevented any discomfort inside.

As this branch of farming is one of the most popular on the coast, an effort was made to put the poultry work here on a practical basis and, by the fall of 1912, it is hoped to have greatly enlarged flocks, especially of the White Leghorn and

Barred Plymouth Rock breeds. As soon as sufficient accommodation can be had in the shape of a laying house, some experimental work in the line of housing and feeding for coast conditions will be attempted.

One feeding experiment was conducted with a number of cull chickens, the results of which are tabulated below. As these were all the fowl available at the time, only the one test could be carried on. Another year, it is hoped to have more stock at hand for experimental work.

The accompanying sketches illustrate the styles of houses used on this Farm. (Fig. 1) gives the ground floor and sectional plan of the Wood's Open Front House. The open front on this house measures 2 feet x 16 feet and in winter the birds are protected by a light cotton screen which is dropped over the window. Fig. 2 is the Tolman Open Front House, the open front on this house being 3 feet x 16 feet, the same system of cotton screening the windows in winter time being used. Fig. 3 is a modification of the Gilbert Open Front House. The double boarding at the back and the cotton screen over the roosts have been omitted as the climate in this district is not severe enough to call for it. These houses have been used throughout the past winter, which has proved a hard one for wind and snow, and on one occasion the Wood's house was buried in snow to the peak, but the cotton screen did its work admirably and kept everything snug inside. Fig. 4 is a sketch of the style of brooder house used here; this house has two open fronts and one window, is portable, and after the young chickens are brooded, can be used as a colony house. It is sectional, easy of construction, and will accommodate about 200 young chickens.

CHEAP RATION FED TO POULTRY.

On a basis of ten hens. *Per day.*

1 lb. wheat fed in litter in morning.
2 lbs. or so of sprouted oats or of mangels—noon.
1½ lbs. oats and barley mixed—night.

Hopper with a mixture of: *Per month.*

4 lbs. shorts.
8 lbs. bran.
4 lbs. ground oats.
2½ lbs. beef scrap.

Water, grit and oyster shell before them all the time.

For newly-hatched chickens we have used very successfully the following methods and foods.

Keep fasting from 48 to 72 hours, then give small grit. For the first day chopped hard-boiled eggs at the rate of three to thirty-five chickens. Second day, bread squeezed dry from skimmed milk and half the ration of eggs. Third day rolled oats. Fourth day ground wheat, rolled oats and water. From this time on they are fed ground wheat, rolled oats, beef scrap, and a little charcoal, until they are old enough to take coarser foods.

At the time of writing, we have not had many chickens to work with as the incubators have not yet hatched but, judging from the experience of the spring of 1911, and as far as we have gone this spring, the method works very well.

FEEDING EXPERIMENT.

TOTAL WEIGHTS IN POUNDS.

Breed.	At Start of Experiment.	First Week.	Second Week.	Third Week.	Average Gain per Bird.	
					Lb.	Oz.
12 B.P. Rocks	47	55	60	62	1	4
1 W. Wyandotte						
1 B. Orpington	11½	14½	16	17	1	13⅓
1 Rhode Island Red						

Feed consumed :—

Oats and Barley	36 lbs.
Mash	64 "
Milk	40 qts.

The last week of the experiment was cold and the mash froze before the birds had a chance to get their fill of it.

The services of a poultryman, Mr. Fred. Nelson, have been secured, who, in addition to doing other work when the flock was small, built and fitted up the hen houses, made the brooders, trap nests and portable chicken houses, feed boxes and almost everything in the line of poultry necessities except incubators. He has made, for trial during the coming season, several styles of brooders, chicken houses and colony houses.

A considerable amount of data has been collected but, as it only covers part of one year, it is reserved for future publication when further experiments have made the results obtained more accurate and comprehensive.

BEES.

With the opening of April, there were fifteen swarms of bees in the apiary. They were strong and had sufficient stores and were working as though they would produce honey although it was almost an impossibility to see the inside of the hives. Swarming commenced very early, and the better part of the honey season was lost in wasted energy in this direction. On account of not being able to secure bee material for prompt shipment, much time was lost in the spring before anything could be done, and it was July before the material was received to make suitable hives; at this time of the year the bees were transferred from the old boxes to the 10-frame Langstroth hives, and any stores which could be transferred, were, but this left them in new hives, with insufficient food, and the honey flow ceased. Quite a number of swarms were caught and hived, but many flew away before we had anything to put them into. During the summer two strong swarms were sold.

In the fall, some of the weak hives were combined with the strong ones, and were fed a very small amount, varying from two to seven pounds of sugar, melted down to a syrup. When combined there were fourteen hives, strong as regards bees, but weak in stores. Sufficient honey was sold from the old hives to more than pay for the sugar that was fed to them in the fall.

As the old hives were distributed around a large area of ground among the hedges, on November 11, they were gathered together in one place and left until the spring. The bees made their first flight on January 16. During the latter part of February the hives were placed on a long low stand by pairs, and it was then found that one swarm was dead. This stand, although not thought to be the best arrangement, was the only one that was practicable at the time.

Three trials were made with winter housing, one strong swarm was fed 6 lbs. of sugar, left with the summer entrance to the hive, an extra super on top, and the feeder inside. This hive was left by the hedge in the middle of the lot. Another strong swarm was fed the same and put into an open shed facing south. Another original box hive which had not been touched during the year, but which had swarmed itself weak, was left in its original place in the open. During the winter, the two outdoor swarms were buried in a snow drift to the depth of five feet, which was allowed to melt away naturally. In the spring, the one in the shed was strong and active, with some stores, the boxed swarm had died, and the one with the super was active, although weak, and very short of stores.

The hardest time of the year on the bees appears to be in March, when there is a warm sun alternating with cool winds and sharp showers. The bees go out to work for pollen, are knocked down by the cool breezes and showers, and many of them never return to the hive.

Within a year or two, when the White Dutch clover, and Alsike, which are now being sown in the hay and pasture mixture, take effect, we should be able to report much more development along this line, for at present we are hardly in working shape.

On March 30, all the hives were working well, though two more had died; in all the remainder the queens were beginning to lay, and pollen was coming in. They are very weak in stores, but strong in numbers, with few exceptions. There are now eleven hives, five of which are in first-class working condition, and should produce honey during the coming season. A good supply of bee material was bought, although the quality in this province is poor and the price high, and we have now a sufficient amount of hives, frames and fittings for the same to last for a few years and run an apiary of twelve to fifteen hives in good order.

BUILDINGS.

In view of carrying on dairy and other live stock operations on the Farm several buildings had to be erected and the old barn remodelled, the total amount of building and removals being: Dairy barn and dairy built, old barn remodelled and cement floors put in, horse barn remodelled, two silos and three small hen-houses built, old hen-house moved to hog-house, a small coal shed built, the implement shed finished, a new system of water pipes and a concrete and stone reservoir almost completed on the mountain, as well as about a mile of wire fencing bought for fields and yards. We also had charge of building for the Health of Animals Branch a stable, a laboratory and a small shed.

Figure No. 1 is diagrammatic of the improvements put on the old barn and the dairy barn that was built and shows the general arrangement of the ground plan including lighting, alleys, stalls, pans and the water piping in dotted lines.

The horse barn will hold eleven horses. The old barn has loose boxes for sixteen to twenty-four calves, a special bull pen and two loose boxes for cows or young bulls, and has a root cellar at the back separated by a stone wall. The cow barn has tying room for forty cows, giving each stall 3 feet 6 inches width, 10 square feet actual glass per cow and when full would have 767 cubic feet air space for each cow. The feed and mixing room is 22 feet x 24 feet, and the silos are 18 feet 2 inches and 14 feet 4 inches by 30 feet high. The weigh room or porch is 10 feet x 10 feet facing the dairy and connected to this latter place by a cement walk 100 feet long.

Figure No. 2 shows the new dairy stable in more detail and enlarged, size 85 feet x 38 feet x 9 feet 5 inches. Solid black lines indicate walls made of 2 inch x 6 inch studding, covered outside with rustic and two plies paper and inside with 1-inch x 4-inch dressed scantling (not V-joint); this is white washed. Four lines indicate windows which have 4 feet x 5 feet glass, two sashes, the top one on hinges opening in

and down from top and can be adjusted from 1 inch to 1 foot. Double lines show doors. Square black marks indicate wooden posts which support loft; a dust-proof floor and ceiling is above. Small double lines inside indicate iron stall fixtures of the James type somewhat modified. The single lines indicate the floor basin for feed and water and the galvanized iron mangers, also the gutter. Single dotted lines show water pipes on ceiling and double dotted lines the drainage from roof, mangers and in case of washing up, from the gutters. The large circles are the silos which are 18 feet 2 inches and 14 feet 4 inches by 30 feet high with roof on them. They are built of 2-inch x 6-inch x 30 feet fir dressed on inside and edges and have eleven hoops ¾-inch iron in four pieces. The silos are joined to the building 12 feet up and then a tube runs to the top into which both sets of doors open. The small building joined to the feed room has a sink and closet for use of the men on the farm and the stable men.

Underneath the cow stand, which has the same amount of concrete and the same mixture as the rest of the floors, there is a foot of field stones and six inches of gravel to make it drier and warmer. The feed alleys are 6 feet 5 inches from wall to manger basin. The cow-stands taper from 5 feet at one end to 4 feet 6 inches at the other and the alley between the cows is 8 feet wide. The gutter is 20 inches wide and 7 inches from bottom to cow stand and 4 inches from bottom to alley behind. The whole floor slopes from end to end 2 inches, except the manger basin which is 1½ inches. We do the feeding from a truck and clean the manure out at present with a wheelbarrow.

Figures No. 3 and 4 show ground floor and upper floor plan of dairy which is 20 feet by 28 feet and 14 feet studs. This is not quite completed. It is fitted with cement floors and wooden walls. The boiler room is built on and we have a general room next for churn, separator and wash room, a small storage room, a cheese room, and small office or entry room from which the stairs lead. Up stairs there are three small rooms and a bath room for the use of the person in charge of the dairy.

When finished and equipped, it is hoped to have a practical farmer's dairy for a herd of forty cows.

WATER SYSTEM.

In order to get a supply of water for the increased number of live stock, a new water system was required at the Agassiz Farm. At the height of 130 feet up the mountain at the back of the Farm, a quantity of rock was blasted out on the site of the old tank and, utilizing the old foundation as far as possible, a reservoir of concrete and stone is being built, which should hold, when completed, slightly over 20,000 gallons. Starting from the barn, 2-inch galvanized iron pipe has been laid 1,600 feet out and the remaining 1,200 feet required to carry the line to the tank with 2½-inch pipe of the same quality. The work was not begun until late in the fall and, as it was necessary to carry cement and sand up the mountain in very small sacks, winter came on before much had been done. The work is being continued this spring and at the present favourable rate of progress, should be completed in April. At present, water is being obtained from a very small temporary dam half-way up, but there is very little head and only a limited supply. When finished, the dam should provide an excellent water supply both for the stock and for fire protection.

CLEARING LAND.

About five acres were grubbed and ploughed, four acres ploughed the second time, and harrowed and disced at intervals of two or three weeks during the season of 1911. This area will be planted to corn in order to bring it into the rotation.

The five acres that were broken will be sown to pasture for next year.

Clearing and breaking land was only done to keep the men and teams busy on days unfit to work on other jobs, and, on account of the extra amount of building going on, this work did not receive the attention it should.

DITCHING.

Four thousand four hundred and thirty-five feet (4,435) of ditch was brushed and burned, six feet along each side. Two thousand and thirty feet (2,030) of the same was widened and deepened from one to two feet. Six hundred and thirty feet (630) was deepened from four to six feet, and boxed with two-inch rough planking, twelve inches by twenty inches.

IMPLEMENTS.

The change in the whole system of farming operations here necessitated the buying of a considerable number of farm implements, which were all of the larger, three and four-horse, type. They include two double-furrow ploughs, two drag harrows, a manure spreader, two farm trucks, two single cultivators and one hay rake. Among the smaller implements bought were a double-mouldboard plough, a fanning mill, a sheaf carrier for the binder, a pea harvester, two sets of double harness, one set of single harness and a buggy. During the year, a 20 h.p. gasoline engine and a Blizzard cutting box were also purchased.

FENCING.

One carload of 6-inch x 6-inch x 8 feet cedar posts, and three hundred and sixty rods of 10 x 54 Page wire fence were bought and erected round the yards and lanes preparatory to the handling of the stock.

MEETINGS.

During the year, very little travelling was done in the province, on account of the nature of the work on the Farm. Beyond a few trips to Vancouver in the interests of our building operations, I attended several meetings of the directorate of the British Columbia Dairymen's Association, the annual agricultural fair at New Westminster, and the annual meetings of the British Columbia Dairymen's and Stockbreeders' Associations at Victoria.

In February, twenty days were spent on a trip to Ottawa to attend the meetings of the National Live Stock Association, the Canadian Seed Growers' Association, and the Dominion Fruit Growers' Conference, and for meetings of all the Experimental Farm Superintendents with yourself and the Honourable, the Minister of Agriculture. The meetings proved most helpful, especially those of the Superintendents, as they helped to simplify and harmonize our work, and my thanks are due to the Honourable the Minister of Agriculture, and to yourself, for affording me this opportunity.

POTATOES—Distribution of Samples.

Variety.	Number of Samples sent out.	Percent. Reported on.	Number of Reports good.	Number of Reports poor.	Number of Crops reported clean.	Average Weight of same.	Number of Crops reported scabby.	Average Weight of crop.	General opinion of Potato, as to quality, etc.
Vick's Extra Early	15	16	....	.....	...	.....	.....	.....	.....
Money Maker	76	26	60	40	71	84	39	103	Fair.
Early White Prize	24	41	90	10	66	51	34	109	Poor.
Burnaby Mammoth	56	44	75	25	65	100	35	157	Fair.
Ashleaf Kidney	45	44	74	26	62	58	38	74	"
Early Potentate	40	20	100	.....	66	73	34	134	"
Gold Coin	80	34	72	28	65	57	35	71	Very good.
Empire State	31	25	66	34	50	98	50	61	"
Early Rose	42	26	55	45	74	53	26	113	Fair.
Early Envoy	34	29	50	50	86	95	14	240	Poor.
Dreer's Standard	26	33	66	34	68	101	32	98	Fair.
Carman No. 1	67	48	84	16	83	97	17	81	Very good.
Late Puritan	18	33	100	.....	50	69	50	77	Fair.
American Wonder	42	29	83	13	100	80	....	.....	Poor.
Rochester Rose	69	12	60	40	100	100	....	.....	Very good.
Seedling No. 2	37	27	87	13	100	125	.....	..	Poor.
Dooley	18	19	....	...	....	.....	.....	.....	.....
Irish Cobbler	22	41	86	14	50	37	50	70	Good.
Everett	10	40	.....	.....	.....	.....	.....	.....	.....
Morgan Seedling	5	34	.....	.....	.....	.....	.....	.....	.....
Bovee	6	14	.....	.....	.....	.....	....	.....	.....

Seven hundred and sixty-three samples were sent out of twenty-one different varieties; about a third were reported on. The Vick's Extra Early, Dooley, Everett, Morgan Seedling, and Bovee varieties had so few reports sent in that it was not possible to gather any data from them. In most cases the Seedling No. 2 was reported on as a poor variety on account of its roughness and the deepness of its eyes. Reports from all over the country stated that it had been a very bad season for potatoes.

CORRESPONDENCE.

Letters received during year	2,825
Letters sent out during year	2,635
Circular letters *re* seed distribution	763

ACKNOWLEDGMENTS.

I beg to acknowledge to you, sir, the thanks which I owe to you for your assistance and advice, and to the other officers at the Central Experimental Farm who have helped me during this, my first year as Superintendent of this Farm. My thanks are also due to Mr. Alex. McKay, farm foreman, Mr. W. G. Harris, herdsman, Mr. H. L. Keegan, who had charge of all the stock until December, and later devoted his attention to the swine and sheep, Mr. Fred Nelson, poultryman, Mr. N. B. Roy, assistant in the office, and to all those on the Farm who have stayed with me throughout the year, who, by their loyal assistance and interest in their work have enabled me to report as I do.

METEOROLOGICAL RETURNS.

—	Maximum Temperature. F.		Minimum Temperature. F.		Precipitation.	Sunshine.		
						Days.	Hours.	Minutes.
1911	Date.	°	Date.	°	Inches.			
April.	30	75	6	26	2·62	29	215	12
May.	31	81	20	36	6·75	22	141	54
June..	14	83	19–20	35	1·65	24	175	18
July...	15–24	94	5	42	1·12	23	226	18
August.....	25	84	15	42	2·97	24	178	..
September.....	1	80	24	40	4·91	18	115	28
October	10	71	27	30	3·57	25	147	06
November.	1	63	11–13	12	10·50	13	38	18
December	6–18	53	30	10	7·69	16	42	42
1912.								
January..	31	53	2. 5–7	12	4·31	15	61	24
February.....	9	54	22	28	10·66	15	70	54
March.....	30	65	8	26	2·18	29	207	.
Totals.....	.....	.....	.....	.....	61·93	253	1,619	34

NOTE.—In the above table of meteorological returns, ten inches of snowfall is reckoned as equivalent to one inch of rainfall or precipitation.

I have the honour to be, sir,
Your obedient servant,

P. H. MOORE,
Superintendent.

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